HOWARD STEIN HUDSON

Engineers + Planners

APPLICATION FOR SPECIAL PERMIT
MIXED-USE BUILDING

11 Dartmouth Street

Malden, Massachusetts

Prepared for

Quaker Lane Capital
200 Portland Street
Boston, MA 02114

Prepared by

Howard Stein Hudson
11 Beacon Street, Suite 1010
Boston, MA 02108
617-482-7080

October 9, 2020

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October 8, 2020

Jadeane Sica, President
Malden City Council
215 Pleasant Street, Rm. 430
Malden MA 02148-4820

RE: Quaker Lane Capital, LLC
Proposed Office Development
11-17 Dartmouth Street

Dear Ms. Sica:

As counsel for Quaker Lane Capital, LLC we are pleased to present this Special Permit application for your consideration to allow for the approval of a non-residential structure between 6 and 12 stories pursuant to Section 300.10 of the Zoning Ordinance.

We propose to build a 9 story office building with 160 fully automated parking spaces underground, which will increase the tax base and add new jobs, while providing an economic multiplier effect on businesses on the Square. Our world-renowned architects have created a cutting edge, Class A office building, the first in a generation in the Square.

We have been obtaining community input since the first of 2020, and WE LISTENED. The height of our original proposal has been reduced by 25% to 9 stories and the parking has more than doubled to 160 spaces.

Our traffic study, with actual counts taken pre-COVID, finds a modest increase in traffic, well within the capacity of both Pleasant and Dartmouth Streets.

This commercial project will bring much needed balance to the Square after the recent residential boom.

Thank you in advance for our attention and your consideration.

Sincerely,

TPCall

Thomas P. Callaghan, Jr.

TPC/lms

cc: Malden Planning Board

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Section 1.
Project Narrative

1 Project Narrative

1.1 PROJECT OVERVIEW

The Subject Site (the Site) includes two parcels and one common way. Parcel 50-259-918, known as 11 Dartmouth Street, houses a three-story building. Parcel 50-259-902, or 17 Dartmouth Street, is used as an open parking area for approximately 50 vehicles.

The common way known as Dartmouth Court is located north of the two parcels to be combined through the subdivision process and, after the proposed improvements, will remain a common way with no change in ownership or use.

For the purposes of drainage, resurfacing, and other improvements, the Site is approximately ± 29,485 square feet (sf)/0.68 Acres. The two combined parcels that will form the Lot are approximately ± 24,342 sf/0.56 Acres.

Please refer to **Figure 1**. Locus Map at the end of this Project Narrative.

1.2 EXISTING CONDITIONS

The Site is bordered by Dartmouth Street to the west; a residential building – 480 Main Street – to the north and northeast; 440 – 446 Main Street, an office building to the east; 15 – 23 Pleasant Street where (temporary) City Hall Building 2 is located to the south and southeast; and 31 – 37 Pleasant Street to the southwest. The entire site is currently covered by impervious surfaces – roof or pavement. The Site is in the Central Business District. The area is urban, and the uses of the surrounding buildings are a mix of office, commercial, and residential space.

For soil conditions, refer to Section 4.0 Stormwater Report section of this Special Permit Application. For existing topographic and utility information, refer to the Existing Conditions plan included in Section 5.0 Plans of this Special Permit Application.

According to the Massachusetts Cultural Resource Information System (MACRIS), the area east of the site was inventoried, and there are no known historic or archeological resources identified on Site. Please refer to **Figure 2.** MACRIS Map at the end of this narrative.

1.3 PROPOSED DEVELOPMENT

The proposed Project will consist of the construction of a nine-story mixed-use building with ± 3,000 sf of ground floor retail space, ± 150,000 sf of office space, an underground garage level and one at-grade level parking containing 160 off-street parking spaces and associated infrastructure

improvements. The existing building at 11 Dartmouth Street will be demolished, and excavation for underground parking levels and foundation of the proposed building will be completed. Pavement will be removed as shown on the Site Preparation Plan (see Section 5.0 Plans of this Application).

Dartmouth Court will be used as the site driveway with two-way vehicular and pedestrian access. Road pavement and sidewalks removed during construction or for utility connections will be restored in materials and finish to match the existing features. An at-grade pedestrian sidewalk will be constructed along the northern side of the building. The total width of Dartmouth Court will vary from 18.8 – 20 feet, which will allow for emergency access.

Trash storage for the proposed building including dumpsters and recycling containers will be located within the interior of the structure. Coordination for trash storage and collection for neighboring properties that was performed via Dartmouth Court is ongoing.

Under the existing conditions, the Site has no landscaped areas. There are no provisions for landscaping in the proposed conditions at the ground plane. To incorporate Biophilic design principles into tenant spaces, the building rooftop will have an outdoor green roof. This space is aimed to improve the wellness of the occupants though a connection with nature while also reducing the heat island effect.

1.4 CONFORMANCE WITH MALDEN ZONING REQUIREMENTS

The Site is in the Central Business (BC) District. There is an existing office building on site known as 11 Dartmouth Corporate Center and a paved parking area with approximately 50 marked parking spaces. The Applicant proposes developing the Project under the BC District dimensional requirements as listed in **Table 1.**

Table 1. Table of Dimensional Requirements per Zoning Ordinance §400.1.2.7 and §400.3

Dimension	Required	Proposed
Lot Area (sf)	5,000	29,485
Frontage (feet)	50	161.42*
Front Yard (sf)	No Minimum	N/A
Side Yard (sf)	No Minimum	N/A
Rear Yard (sf)	No Minimum	N/A
Min. Usable Open Space (sf)	No Minimum	N/A
Coverage (sf)	No Maximum	N/A
Density	N/A	N/A
Maximum Height	12 stories	9 stories

**Frontage of 11 and 17 Dartmouth Street only.*

1.4.1. DIMENSIONAL REQUIREMENTS:

The proposed Project will meet all dimensional requirements of the BC District. The Applicant will not need to request a Variance.

1.4.2. PARKING REQUIREMENTS:

Non-residential uses within the BC District are not required to conform to the off-street parking requirements (see §500.2.8.1.). However, the Applicant proposes the construction of one level of underground parking and one at-grade parking level with a total of 160 parking spaces. Those parking spaces would be used by tenants of the office space in the building and alleviate some of the parking demand in the area of the development. Six (6) of the parking spaces will be ADA accessible. The Project proposes 70 – 80 bicycle racks to accommodate 140 – 160 bicycles. We will exceed the minimum requirement for bicycle parking is one rack per 10,000 sf of commercial space as stipulated in §500.2.8.5, which would require space for 15 bicycles.

1.5 REQUIREMENTS RELATED TO SECTION §12.12.100 (300.10)

The Zoning Ordinance requires that a Special Permit be requested for proposed structures over six stories in the BC district. To evaluate such a request, the City Council needs to consider four aspects of the Project as follows:

1.5.1. POST DEVELOPMENT TRAFFIC AND CIRCULATION:

The City Council must find that traffic and circulation shall be adequate following project development. The applicant shall supply traffic studies of the existing traffic on surrounding streets as well as the projected loads resulting from the construction of the proposed building. Such studies shall be performed by a qualified traffic engineer in conformance with the criteria established by the Transportation Research Board of the National Research Council, and shall include AM and PM hourly peaks. For the purposes of this Special Permit, "Adequate" shall mean a level of service of "D" or better.

The Applicant has provided a traffic study for review by the City, prior to the submittal of this Special Permit Application. The traffic study is included under a separate cover as Attachment 3. The traffic study was prepared by a qualified traffic engineer and concludes that the anticipated traffic and circulation will be adequate. The Project proposes to reconstruct the sidewalks on both sides of Dartmouth Street from Pleasant Street to Garnet Street, including replacing the accessible ramps at the corners of Garnet Street to bring them into ADA compliance The local street network can accommodate the project without issue.

1.5.2. SHADOW STUDY:

The City Council must find that the proposed structure will create no significant new shadow for any properties in Residence A and B zoning districts. To insure the protection of solar access for adjacent neighborhoods, the developer must provide shadow analysis, drawn by a registered architect, for 9:00 A.M., 12:00 Noon, and 3:00 P.M. based upon standard time, for the winter solstice (December 21), spring and fall equinoxes (March 21 and September 21) and summer solstice (June 21).

The site does not abut Residence A or B districts. No new shadows fall on Residence Zones A/B, as required by City of Malden Zoning. The proposed building will cast shadow over a portion of the ROI development known as 480 Main Street for a limited time of the day throughout part of the year. The Applicant has provided a shadow study in Section 2 of this Special Permit Application.

1.5.3. HEALTH, WELFARE, SAFETY, PEACE AND ENJOYMENT:

The City Council must find that the proposed structure will not be detrimental to the health, welfare, safety, peace and enjoyment of the nearby residents, and will not cause increases in loitering, disturbances, disorderly conduct, or excessive noise, or a decrease in air quality, and further, the Board must find the proposed use is in the interest of the public good.

The Project will introduce office space and retail space on the ground floor. Both of those uses are anticipated to generate foot traffic, as well as more business for local restaurants and services in Malden Center. Better use of the currently underutilized parcels will generate more tax revenue for the City. The proposed Project will not be detrimental to the health, welfare, peace, and enjoyment of the nearby residents, and will not cause increases in loitering, disturbances, disorderly conduct or excessive noise, or a decrease in air quality.

1.5.4. WATER, SEWER, DRAINAGE, WASTE REMOVAL AND RECYCLING:

The City Council must find that water, sewer and drainage systems will be adequate following project development and that adequate provisions have been made for solid waste removal and recycling. The applicant shall provide studies, performed by a registered engineer, showing the impact the proposed development will have on existing water, sewer and drainage systems. For purposes of this Special Permit, a sewer shall be deemed "adequate" if its capacity is sufficient to accept discharge equivalent to the maximum discharge per dwelling unit, as set forth in Department of Environmental Protection standards; a drainage system shall be deemed "adequate if its capacity is sufficient to accept post-development runoff resulting from a 10 year storm; a water system shall be deemed "adequate" if development will result in no reduction to existing pressure and volume.

The Applicant has provided an analysis of Water, Sewer, Drainage, and Waste Removal performed by a registered engineer indicating that the existing water, sewer, and drainage systems are anticipated to be adequate to serve the needs of the proposed Project. Details of this analysis can be found in Section 1.6. below:

1.6 SITE PLAN AND PROPOSED UTILITIES

1.6.1 SITE PLAN:

The Site Plan was prepared as a collaboration between the architect, Gensler, and the civil engineer, Howard Stein Hudson (HSH). The proposed building occupies a significant portion of the site with the remainder being paved access and service areas. Please refer to the Site Plans included in Section 5.0.

1.6.2. GRADING:

The existing site does not provide significant change in grades. The Proposed development will meet the existing sidewalk and paved roadway grades as shown on the Grading Plan included in Section 5.0. Drainage structures will be installed at localized low points as shown on the Drainage and Utility Plan also included in Section 5.0.

1.6.3. STORMWATER MANAGEMENT:

The existing site is covered with impervious surfaces such as the roof of the existing building located at 11 Dartmouth Street and bituminous pavement areas used as access road and parking. A culvert conveying Spot Pond Brook runs along the eastern property line. Part of the runoff generated by the paved parking areas flows into a catch basin located in the northeast corner of the site that conveys the collected runoff to the Spot Pond Brook Culvert through an eight-inch cast iron pipe. Another portion of the runoff generated by the roof and paved areas is collected into two catch basins near the center of the parking area. Those two catch basins are connected with an eight-inch PVC pipe, so one basin overflows in the other.

The drainage system of the proposed Project has been designed to collect the clean roof runoff in an underground infiltration system that provides groundwater recharge. The runoff generated by the paved areas will be collected separately, will be pre-treated in a water quality unit (WQU), and will reach an underground infiltration system that provides groundwater recharge. Both underground infiltration systems will overflow into an outlet control structure and the combined flow will be discharged into the Spot Pond Brook culvert in a controlled manner.

The runoff that will be discharged in the Spot Pond Brook Culvert in the post development condition will be cleaner than the existing discharge in the culvert because the roof runoff is considered clean and the runoff generated by the paved areas will be pre-treated in a WQU

prior to accumulating in the underground infiltration system where additional settling of total suspended solids will occur. The Site will discharge a smaller quantity of water due to recharge back into the aquifer occurring in the underground infiltration system. The peak rate of discharge into the Culvert will be lower because the runoff will be accumulated in the underground infiltration structures and will be released via an Outlet Control Structure.

1.6.4. WATER SERVICE:

City of Malden is part of Massachusetts Water Resources Authority (MWRA) Region 1. There is a six-inch water main running in Dartmouth Street, serving the existing building at 11 Dartmouth Street. Conversations with the Malden Engineering Department indicate that there is an adequate municipal water supply available for potable and fire safety connections for the proposed development.

The net increase in demand for potable water is estimated as 11,346 gallons per day (gpd) based on the net new sewage flow estimate calculated in Section 1.5.9 and adding 10% to account for system losses, including the average requirements for the development's cooling systems. Coordination of a hydrant flow test with the Malden Water Superintendent is ongoing.

1.6.5. SEWER SERVICE:

City of Malden is part of MWRA Region 1. The City sewer is treated at the Chelsea Creek Headworks facility. The existing building is connected to an 18-inch sewer main running in Dartmouth Street. Coordination between the Engineer and the City of Malden Engineering Department is ongoing for the proposed sewer connection.

The total sewer flow from the existing building is estimated at 1,310 gpd based on the existing building uses and design sewer flows provided in 314 CMR 15 (Title V) as summarized in **Table 2.**

Table 2. Existing Sanitary Sewer Flow

Use	Area	Unit Flow Rate	Flow
Office Space	17,445 sf	75 gpd / 1,000 sf	1,310 gpd

The net new sewer flow from the proposed development is estimated at 10,315 gpd based on the existing and proposed building uses and design sewer flows provided in 314 CMR 15 (Title V) as summarized in **Table 3.**

Table 3. Projected Sanitary Sewer Flow

Use	Area	Unit Flow Rate	Flow
Retail Space	3,000 sf	75 gpd / 1,000 sf	225 gpd
Office Space	150,000 sf	75 gpd / 1,000 sf	11,250 gpd
		Total Flow	**11,625 gpd**
		Existing Flow	**1,310 gpd**
		Net New Flow	**10,315 gpd**

1.6.6 GAS SERVICE

There is a 6-inch gas main running in Dartmouth Street owned and operated by National Grid. In a phone conversation with the regional manager conducted on March 10, 2020, the design team confirmed that National Grid started coordination of a proposed connection with the account manager.

1.6.7. TELEPHONE, CABLE TV, AND HIGH-SPEED INTERNET

Availability of high-speed internet was confirmed by a Comcast representative in a phone conversation conducted on March 9, 2020. Capacity and connection design will be coordinated during the design stage.

1.7 APPROVAL NOT REQUIRED PLAN

The Site includes two parcels and one common way. Parcel 50-259-918 and Parcel 50-259-902 are proposed to be combined into one parcel after the completion of the Special Permit review process, should the permits be granted. The Approval Not Required (ANR) process proposes to dissolve the parcel lines between the two parcels and create one parcel. The ANR plan will show that the new parcel meets the requirements for lot size and frontage for the BC District and satisfies the requirements for approval of ANR plan under MGL Chapter 41 Section 81 (Subdivision Control Law). The two combined parcels that form the Lot are approximately ± 24,342 sf.

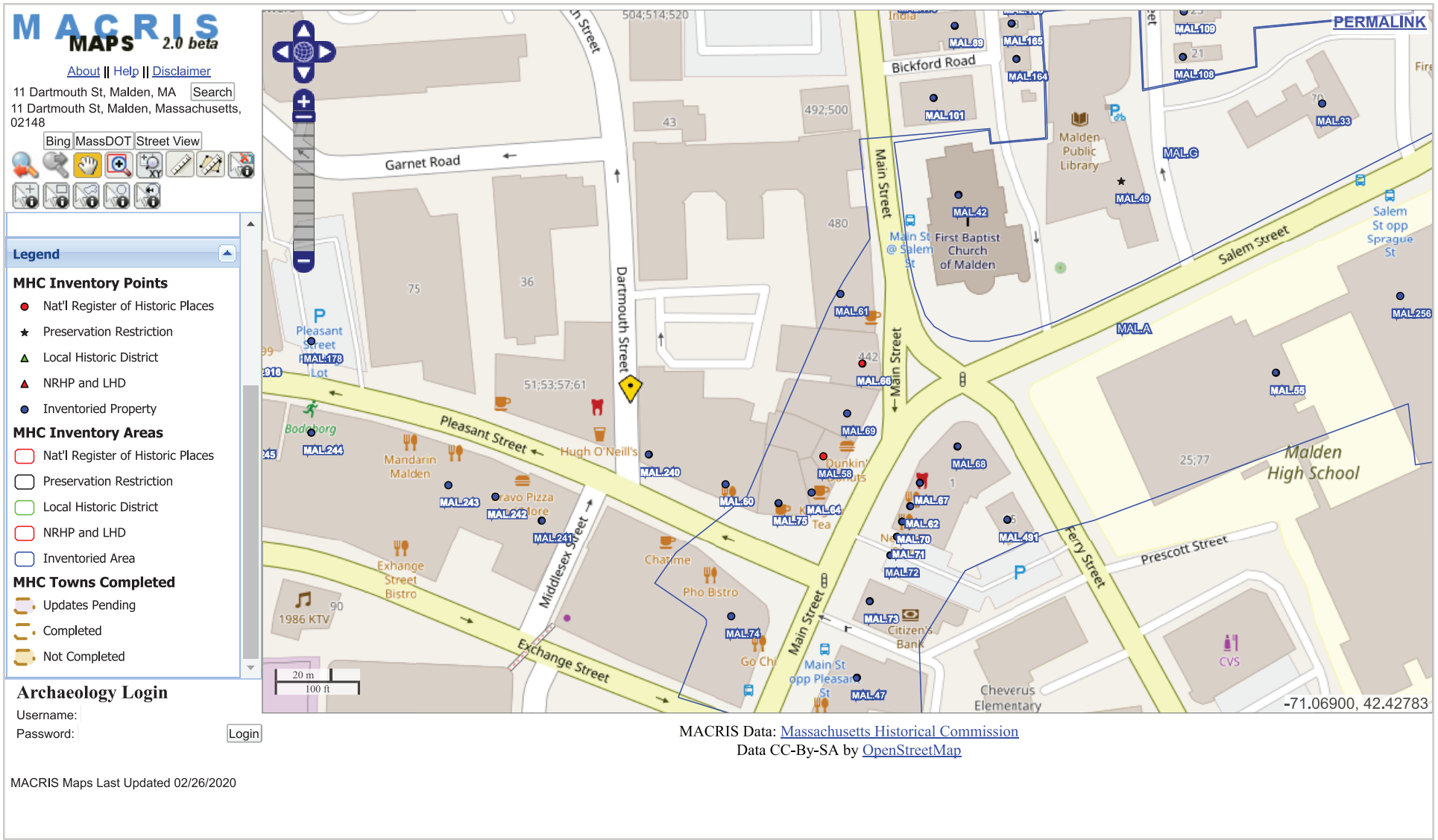
The common way known as Dartmouth Court is located north of the two parcels to be combined and after the proposed improvements will remain a common way with no change in ownership or use. Please refer to Figure 1. Locus Map at the end of Project Narrative.

1.8 PERMITS AND APPROVALS:

- Planning Board: endorsement of ANR to combine two parcels.
- Building Inspector: Demolition Permit per General Ordinance §3.37 – granted.
- Building Inspector: Foundation Permit
- Building Inspector: Building Permit
- Fire Department: Parking Fuel Storage Permit 527 CMR 5.00
- City Engineer: Street Opening Permit

Figure 1. ***Locus Map***

Figure 2. ***MHC MACRIS Map***



Section 2.
Shadow Study

PROVIDED UNDER SEPARATE COVER

Gensler

October 8, 2020

Mark Barer, Principal
Quaker Lane Capital

Subject: **Shadow Study Memorandum**
11 Dartmouth Street Property, LLC
Office Building at 11 Dartmouth Street, Malden, MA
Gensler Project Number 011.7527.001

Dear Mark:

The following letter describes the procedure and results of the shadow study analysis conducted by the Gensler team. No new shadows fall on Residential zones A / B as required by the City of Malden Zoning requirements. The study was conducted for the proposed building at 11 Dartmouth Street Malden, Ma.

The attached graphic was created using the City of Malden Zoning Ordnance Chapter 12 Sec 300.10.2. Per zoning requirements, the study is created to analyze impacts of the proposed building on surrounding context and impacts on Residential zones A and B.

Both existing building and proposed building shadows are depicted using the date and times described by the City of Malden Zoning section as noted below.

Spring and Fall Equinoxes – March 21 and September 21
Winter Solstice – December 21
Summer Solstice – June 21
Daily times – 9:00 am, 12:00pm noon and 3:00pm

The "new shadows" depicted on the diagram are shown on occupiable horizontal surfaces such as public ways and private yards / roof decks. No new shadows fall on Residential zones A / B as required by the City of Malden Zoning requirements.

Attachment: 11 Dartmouth Street shadow study

11 Dartmouth Street - Shadow Analysis

Winter Solstice (December 21st)

Spring Equinox (March 21st)

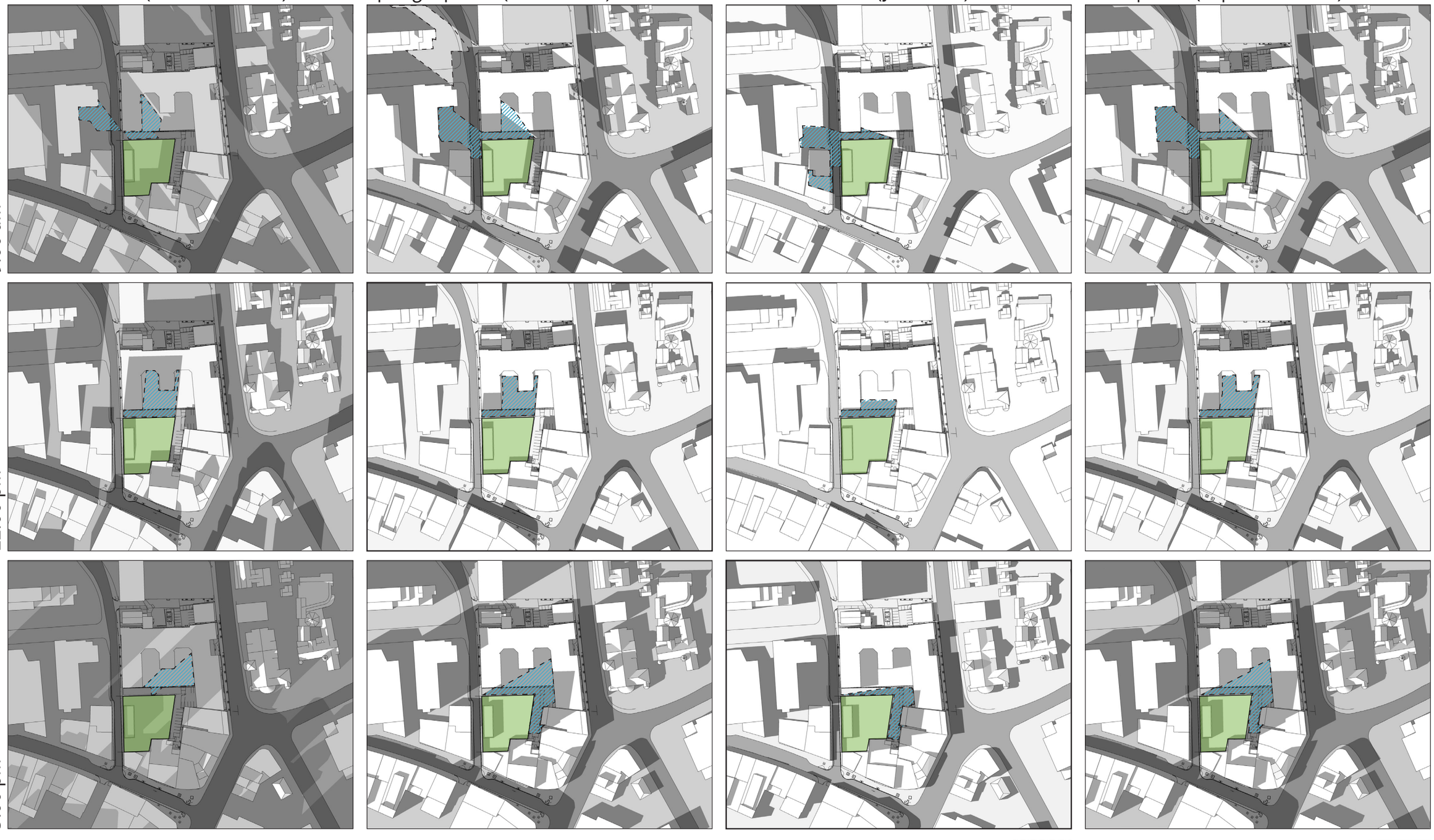
Summer Solstice (June 21st)

Fall Equinox (September 21st)

9:00 am

12:00 pm

3:00 pm



NEW SHADOWS

PROPOSED BUILDING

N

Section 3.
Traffic Study

PROVIDED UNDER SEPARATE COVER

MALDEN, MASSACHUSETTS

11 Dartmouth Street
TRANSPORTATION STUDY

Prepared for
Quaker Lane Capital

Prepared by
Howard Stein Hudson

October 2020

HOWARD STEIN HUDSON

Engineers + Planners

TO:	Kenneth Petraglia, P.E., PTOE	DATE:	October 9, 2020
FROM:	Keri Pyke, P.E., PTOE Michael White	HSH PROJECT NO.:	2019251
SUBJECT:	11 Dartmouth Street – Proposed Office Tower Responses to Peer Review Comments		

Howard Stein Hudson (HSH) has prepared this memorandum in response to the comments received on the 11 Dartmouth Street – Proposed Office Tower from the City's peer review consultant, Kenneth J. Petraglia, P.E., PTOE, on behalf of the Malden Planning Board dated May 5, 2020.

In direct response to feedback we received from community leaders and government officials over this past spring and summer, we modified our design to increase the number of parking spaces and reduce building height. We presented this revised design at a virtual community meeting on October 1, 2020 and received very supportive feedback. Accordingly, the revised Traffic Study is predominantly the same as the version submitted last Spring, with the exception of updating the description of the building program to incorporate the increased parking count and items that specifically respond to peer review comments. Responses can be found in this memorandum, and the more detailed responses are contained in the updated report. These changes to the parking count and building height did not impact the results of the report.

Comments and Responses

Peer Review Comment 1 – Crash Data – A minimum of three full years (and preferably five full years) of crash data are required per MassDOT's Transportation Study Guidelines. This can be corrected either accessing the remainder of 2017, or by adding crash data for 2014 to complete the three years. This section should also include mitigation measures.

HSH Response: The TIA includes three years of crash data, 2015, 2016, and 2017. The MassDOT IMPACT Portal was used to obtain crash data from the most recent three years of available data, which included all of the data between the dates of January 1, 2015 through December 31, 2017. The IMPACT portal expressly states "any crash records or data provided for the years after 2017 are subject to change at any time and are not to be considered up-to-date or complete;" therefore, crash data including and after January 1, 2018, were excluded from the analysis.

Intersection Crash Mitigation Recommendations:

Main Street/Ferry Street/Salem Street – Of the 23 crashes that occurred at this intersection, 10 were reported as sideswipe and six were reported as angle collisions. Seven of the 16 most prevalent crash types were reported to have involved a parked vehicle. Crashes of these types can often be attributed to narrow lane widths as well as the existence of on-street parking at intersection approaches. The lane widths at this intersection range between 10 and 20 feet. In order to reduce the number of sideswipe and angle crashes at this intersection, the City could restrict on-street parking at the intersection's approaches. However, that could potentially negatively impact the Downtown Malden businesses. Therefore, we do not recommend restricting or removing on-street parking.

Main Street/Pleasant Street – Of the 13 crashes that occurred at this intersection, five were reported as rear-end, three were reported as sideswipe and three were reported as single-vehicle crashes. Six of the 11 most prevalent crash types were reported to have involved parked vehicles. Crashes of these types can often be attributed to narrow lane widths as well as the existence of on-street parking at intersection approaches. The lane widths at this intersection range between 12 – 16 feet. In order to reduce the number of crashes at this intersection, one solution would be to restrict parking in its vicinity; however, we understand that on-street parking is important to Downtown Malden. Therefore, we are not recommending that the City restrict on-street parking at the intersection's approaches. The signal at this location is there only to provide a signalized pedestrian crossing. HSH observed that pedestrians routinely do not wait for the WALK light before crossing. The rear-end crashes could be a result of motorists stopping suddenly due to pedestrians crossing against the green light.

Main Street/Centre Street – Of the 47 crashes that occurred at this intersection, 16 were reported as angled and 15 were reported as rear-end. These types of crashes are not easily mitigated as they can often be attributed to distracted driving, driver inattention, or visual impairment due to weather conditions. One possible solution to reduce the number of angled collisions at the intersection would be to replace the existing doghouse signal head with a four-section signal head that includes a flashing yellow arrow, which will reinforce that through traffic has the right of way for vehicles using the permissive left turn phase. A possible solution to reduce the number of rear-end collisions that occur at the intersection would be to install backplates on the overhead signals in order to reduce sun glare during the early morning and late afternoon hours. Additionally, rephasing the intersection to include an exclusive pedestrian phase would reduce the number of pedestrian conflicts that may cause motorists to brake hard or mis-steer in order to avoid a pedestrian collision.

Dartmouth Street/Middlesex Street/Pleasant Street – Of the four crashes that occurred at this intersection, two were reported as angled. Both of the angled crashes involved a pedestrian utilizing the marked crosswalk across Middlesex Street. These crashes could be attributed to an obstructed motorist line-of-sight due to on-street parking along Pleasant Street. In order to improve pedestrian safety at the intersection, the City could remove the first two on-street parking spaces along the south side of Pleasant Street, east of Middlesex Street. However, again recognizing the importance of parking in Downtown Malden, we do not believe the City would want to remove on-street parking to improve sight distance.

Dartmouth Street/Mountain Avenue – Of the eight crashes that occurred at this intersection three were reported as angled and three did not have a crash type reported. Five of the six most prevalent crash types at this intersection involved a parked vehicle. Crashes of these types can often be attributed to narrow lane widths as well as the existence of on-street parking at intersection approaches. The lane widths at this intersection range between nine and 11 feet. In order to reduce the number of crashes at this intersection it is recommended that the City restrict on-street parking in the vicinity of the intersection.

Peer Review Comment 2 – Pavement markings – Pedestrian crosswalks and intersections are faded in much of the study area. The Proponent has agreed to upgrading sidewalks and thermoplastic striping on both sides of Dartmouth Street; this should be extended to Garnet Road.

HSH Response: The Proponent has agreed to restripe the existing crosswalk with thermoplastics (ladder pattern) at the intersections of Pleasant Street/Dartmouth Street/Middlesex Street as well as installing ADA-compliant tactile warning panels at the intersection of Main Street/Florence Street. Additionally, the Proponent has agreed to provide new sidewalks and ADA-compliant pedestrian ramps along both sides of Dartmouth Street from Pleasant Street to Garnet Street.

Peer Review Comment 3 – Traffic Analysis – As discussed above, the Transportation Study analysis of the three signalized intersection indicates that the proposed timing change at the Main Street/Ferry Street/Salem Street intersection should not be implemented.

HSH Response: The Proponent will not implement the timing changes at the Main Street/Ferry Street/Salem Street intersection.

Peer Review Comment 4 – Traffic Analysis – At the intersection of Main Street/Ferry Street/Salem Street the Salem Street approach consists of one wide approach, which motorists treat as two narrow approaches. This approach should either be striped to show a solid white lane adjacent to the curb (indicating a single lane) shoulder, or the striping could be widened to two lanes by offsetting the center striping.

HSH Response: The Proponent has committed to providing an appropriate sum to the City of Malden to be used during annual restriping efforts. This sum can be used as the City sees fit but should be used to reconfiguring the lane use at the Salem Street westbound approach of the Main Street/Ferry Street/Salem Street intersection.

Peer Review Comment 5 – Transportation Demand Management – The TDM discussion includes several measures to complete the program. The success of the program requires several components as listed in the Transportation Study. To what extent are these measures secured?

HSH Response: The Proponent has committed to the following TDM measures as outlined in the TIS.

- ***Transportation Coordinator*** – The Project will designate a transportation coordinator to manage all transportation issues associated with the Project. The transportation coordinator will oversee transportation issues, including parking, service, loading, and move-in/move-out activity. The transportation coordinator will work with residents as they move in and to raise awareness of public transportation.
- ***Tenant Orientation Packets*** – These packets will provide all new tenants with information about available TDM programs and public transportation options (such as the MBTA rapid transit, bus, and commuter rail service in Malden, as well as the local car-sharing services) including program information, route schedules, maps, and fare information. While tenants may need to drive, bike, or be dropped off, to take advantage of some of these options, their use can reduce the overall impact on the local and regional transportation network.
- ***Bicycle Storage*** – The Proponent will provide 70 – 80 on-site secure bicycle storage spaces for Project tenant employees within the parking garage.
- ***Unbundled Parking*** – The Proponent will separate the rental of on-site parking spaces from tenant leases.

- ***Rideshare Information*** – The Proponent will provide information on area carpool and vanpool participants.
- ***Internal ride-matching*** **–** The Proponent will encourage tenants to organize an internal ride-matching program for employees who may be more willing to participate in carpooling and vanpooling with fellow employees than will participants in a large regional database.
- ***Guaranteed Ride Home*** – The Proponent will encourage employers to arrange to provide Guaranteed Ride Home when public transit service is not feasible or during hours which transit service is no longer available to an employee's home. Guaranteed Ride Home is designed to rescue commuters who are worried about how they'll get home when an emergency arises. It provides commuters who regularly (twice a week) carpool, vanpool, bike, walk or take transit to work with a free and reliable ride home. Commuters may take advantage of GRH up to four times per year to get home for unexpected emergencies, or for unscheduled overtime if the employer mandates that an employee must stay late.
- ***Transit Screen*** – The Proponent will provide a Transit Screen, which displays up-to-date arrival and departure information relating to different mobility options within the area.

Peer Review Comment 6 – Parking – The project will include 75 parking spaces. What is the ratio of tenants and visitors to the site? The TIA mentions that the proponent has also initiated discussions with the City of Malden Parking Department and possibly others, to lease additional spaces. At what point will the number of parking spaces no longer create a TDM environment?

HSH Response: The Proponent has adjusted the original building program to increase the number of onsite parking spaces from 75 to 161 by using an automated parking system developed by CityLift. All 161 parking spaces will be reserved for building tenants. With this increase in on-site parking spaces the Proponent is no longer pursuing additional off-site spaces. The Proponent will continue to provide the previously outlined TDM measures to encourage non-single-occupant-vehicle (non-SOV) travel to the site.

Peer Review Comment 7 – Transportation Demand Management – TDM discussion references "Project residents" and "working with residents." Please clarify or confirm there is no residential component to this project.

HSH Response: HSH confirms that there are only office and retail components to this project. Both references to "residents" were erroneous and should instead reference "tenants."

Peer Review Comment 8 – Traffic Analysis – Elaborate on the reasons for lane imbalances noted in the traffic volume networks.

HSH Response: Lane imbalances throughout the study area can be attributed to differing peak hour time frames per study area intersection, as well as different data collection dates due to the vandalism of count equipment and the expansion of the study area. In order to provide a conservative analysis of existing conditions at each study area intersection, the highest 60-minute volumes were used without balancing.

Peer Review Comment 9 – Land Uses – Please describe the type of uses that might be expected for Retail/Shopping for this development.

HSH Response: The Proponent has not yet secured a tenant for the ground floor commercial space of this development.

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Executive Summary

Howard Stein Hudson (HSH) prepared a Traffic Impact Study (TIS) on behalf of Quaker Lane Capital for their proposed office building located at 11 Dartmouth Street in Malden, Massachusetts. The Project typifies an ideal Transit-Oriented Development (TOD) located in a vibrant, walkable, and central business district proximate to the Orange Line, commuter rail, and bus hub at Malden Center station. The target tenant profile is comprised of smaller companies with a predominantly millennial workforce focused on the innovation economy. These tenants tend to take alternative modes of transportation to work and keep unconventional work hours, thereby decreasing weekday peak hour traffic. In summary, this study demonstrates that the proposed office building has minimal adverse impact on traffic and parking, as highlighted below.

Traffic: The project will add a small number of trips to the surrounding roadway network and can accommodate the project's new trips without difficulty. New peak-hour trip generation only accounts for 6.1% and 1.8% of Dartmouth Street's and Pleasant Street's maximum hourly capacity, respectively, and translates into two additional cars per minute along Dartmouth Street and one additional car every two minutes along Pleasant Street, both of which would only be marginally noticeable. Furthermore, the analysis of study area intersections indicates only a few locations will see small changes in delay. These small changes can be mitigated through traffic signal timing adjustments, however a peer review of this project suggested that the signal timing adjustments should not be made. At the peer reviewer's suggestion, the Project will reconstruct the sidewalks on both sides of Dartmouth Street from Pleasant Street to Garnet Street, including ADA-compliant ramps at the intersection of Garnet Street and Dartmouth Street.

Parking: The Malden Central Business District zoning overlay only requires parking for residential whereas office is exempt. However, in order to be responsive to the concerns raised by the City of Malden, the project Proponent will construct approximately 161 parking spaces, which reflects a ratio of 1.07 parking spaces/1,000 square feet (sf) of office. Kendall Square in Cambridge, an area with aggressive programs for transportation demand management (TDM) measures, including limiting off-street parking, has an overall parking ratio of 0.1 spaces per 1,000 sf. While the Proponent is not proposing a parking ratio of 0.1 per 1,000 sf, the proposed parking ratio is reasonable in combination with the Proponent's proposed TDM measures as well as the types of businesses to whom the space will be marketed.

Introduction

In accordance with the City of Malden Zoning Ordinance, proponents of major construction projects are required to submit a transportation study to the City that assesses existing and future traffic conditions. This study, prepared by HSH for Quaker Lane Capital (the Proponent), presents the traffic and parking impacts associated with the proposed office tower development (the Project), located at 11 Dartmouth Street in Malden, Massachusetts. This report has been prepared in conjunction with the Special Permit Application.

Project Description

The Project will consist of the demolition of the existing structure and the construction of a new, nine-story, approximately 150,000-sf office building with an approximately 3,000 sf ground floor commercial component. The existing building consists of a three-story, approximately 17,000 sf office building (occupied by the Dartmouth Corporate Center), with a private parking lot. The Project is being marketed to small start-up companies. The Project will continue to utilize the existing private way to the north of the building. Loading and service accommodations will be provided on-site, eliminating the need for deliveries and trash removal to occur along Dartmouth Street. On-site parking will be in one underground garage level and parking at-grade in the rear of the building providing approximately 161 spaces to building tenants via the CityLift automated parking system.

Study Area

The extent of the study area generally includes Main Street to the east, Centre Street to the south, Washington Street to the west, and Mountain Avenue to the north. The study area intersections were defined collaboratively with the City and includes the following ten intersections:

- Main Street/Florence Street (signalized);
- Main Street/Salem Street/Ferry Street (signalized);
- Main Street/Pleasant Street (signalized);
- Main Street/Exchange Street (signalized);
- Main Street/Centre Street (signalized);
- Florence Street/Washington Street (signalized);
- Pleasant Street/Dartmouth Street/Middlesex Street (unsignalized);
- Florence Street/Ramsdell Road (unsignalized);
- Dartmouth Street/Ramsdell Road (unsignalized); and

- Mountain Avenue/Dartmouth Street (unsignalized).

The study area intersections are shown in **Figure 1**.

Study Methodology

This transportation study and its supporting analyses were conducted in accordance with the Massachusetts Department of Transportation (MassDOT) guidelines and are described below.

The Existing (2020) Condition analysis includes an inventory of the existing transportation conditions such as traffic characteristics, parking and curb usage, transit operations, pedestrian and bicycle facilities, and car and bike share services. Existing counts for vehicles, bicycles, and pedestrians were collected at the study area intersections. A traffic data collection effort forms the basis for the transportation analysis conducted as part of this evaluation.

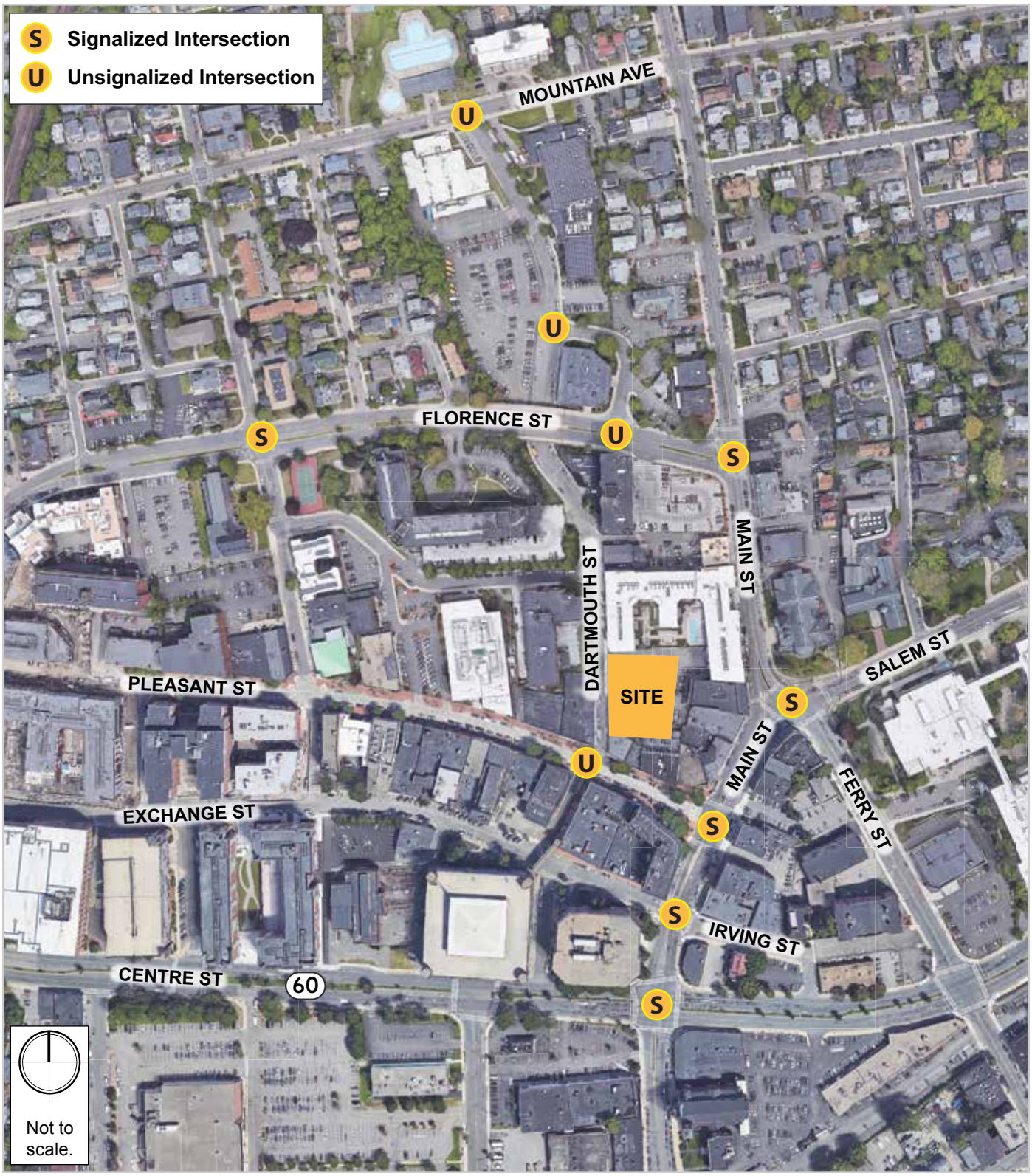
The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. The long-term transportation impacts are evaluated for the year 2027, based on a seven-year horizon from the year of the filing of this traffic study.

The No-Build (2027) Condition analysis includes general background traffic growth, traffic growth associated with specific developments (not including this Project), and transportation improvements that are planned in the vicinity of the Project site.

The Build (2027) Condition analysis includes a net increase in traffic volume due to the addition of Project-generated trip estimates to the traffic volumes developed as part of the No-Build (2027) Condition analysis. The transportation study identified expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies.

The final part of the transportation study identifies measures to mitigate Project-related impacts and to address any traffic, pedestrian, bicycle, transit, safety, or construction related issues that are necessary to accommodate the Project.

Figure 1. *Study Area*



Existing Traffic Condition

Existing Roadway Condition

The study area includes the following roadways described below, categorized according to the Massachusetts Office of Transportation Planning classifications. All roadways are under the jurisdiction of the City of Malden. Roadway geometry descriptions are based on field observations.

Centre Street (Route 60) is an urban principal arterial that consists of two travel lanes in each direction, separated by an approximately four-foot raised and landscaped median. Centre Street runs east-west between Eastern Avenue to the east and Pleasant Street to the west. Exclusive right and left turn lanes are provided at key intersections. Parking is not permitted along Centre Street. Sidewalks are provided along both sides of the roadway.

Main Street, an urban principal arterial, is oriented north-south with one travel lane in each direction between the Melrose City line and the Everett City Line. Exclusive right- and left-turn lanes are provided at key locations. South of Florence Street, Main Street widens and is divided by a raised landscaped median on its approach to Salem Street and Ferry Street, with a combination of flush and raised medians between Salem Street and Centre Street. On-street parking is provided along both sides of Main Street. Sidewalks are provided along both sides of the roadway in the project area.

Exchange Street, an urban minor arterial approximately 0.3 miles in length, runs east-west between Main Street to the east and Commercial Street to the west. Exchange Street runs one-way eastbound and operates as a single travel lane, though the roadway is wide enough for parking and valet activity to take place without interrupting flow. Metered on-street parking is provided on both sides of the roadway, generally parallel parking on both sides of the roadway. There is one section between Washington Street South and Middlesex Street that provides head-in angle parking along the north side of Exchange Street. Sidewalks are provided on both sides of Exchange Street.

Pleasant Street, an urban minor arterial, is one-way westbound with one travel lane and one bike lane, between Main Street and the Government Center complex, where it currently ends. Pleasant Street is discontinued by Malden Government Center between Commercial/Florence Street and Exchange Place. In the near-future, Pleasant Street will be reconnected at Florence Street/Commercial Street (see No-build Conditions section for additional detail). Brick sidewalks are provided along both sides of the roadway and on-street parking is provided within the study area. Metered on-street parking is provided on both sides of Pleasant Street within the study area.

Florence Street, an urban collector approximately 0.4 miles in length, connects Pleasant Street and Main Street and runs primarily east-west. Florence Street consists of two travel lanes in each direction divided by a raised landscaped median ranging from six to eleven feet in width with intermittent median breaks. There is a curvilinear alignment on Florence Street between Pleasant and Washington Streets. Sidewalks are provided along both sides of the roadway and on-street parking is prohibited.

Dartmouth Street, an urban collector roadway, is one-way northbound with one travel lane, between Pleasant Street and Garnet Street. North of Garnet Street to Mountain Avenue, Dartmouth Street is two way with one travel lane in each direction. Concrete sidewalks exist along both sides of the roadway from Pleasant Street to the Florence Street overpass where the sidewalk turns to asphalt along the west side of the roadway and remains concrete along the east side. On-street parking is restricted along both sides of the roadway for approximately 200 feet north of Pleasant Street. Between the Project site driveway and Garnet Street, on-street parking is provided along the west side of the roadway. Between Garnet Street and Ramsdell Road, on-street parking is provided along both sides of the roadway. North of Ramsdell Road, on-street parking is provided along the east side of the roadway.

Washington Street, an urban collector roadway, is oriented north-south between Exchange Street to the south and Fellsway East to the north. Washington Street is primarily a two-way roadway with one travel lane in each direction. The roadway operates as one-way northbound with one travel lane between Pleasant Street and Garnet Street, and as one-way southbound with one travel lane between Pleasant Street and Exchange Street. Within the study area, on-street parking is provided on both sides of the roadway south of Pleasant Street, and along the west side of the roadway north of Pleasant Street. Sidewalks are provided along both sides of the roadway within the project area.

Mountain Avenue, an urban collector roadway approximately 0.6 miles in length, runs east-west between Mount Vernon Street to the east and Summer Street to the west. Mountain Avenue consists of one travel lane in each direction and on-street parking is provided along the south side of the roadway. Sidewalks are provided along both sides of the roadway within the project area.

Existing Intersection Conditions

The study area intersections are described in the following paragraphs.

Main Street/Florence Street is a signalized intersection with three approaches. The Florence Street eastbound approach consists of a 12-foot exclusive left-turn lane and a 12-foot exclusive right-turn lane. The Main Street northbound and southbound approaches each consist of a single 13-foot travel lane. On-street parking is not provided on Florence Street; however, seven-foot, one-hour

parking lanes are provided along both sides of Main Street. Crosswalks are provided across all legs of the intersection; a refuge island is provided along the crosswalk across Florence Street. The signal phasing operates in a four-phase configuration. Phase 1 consists of a Main Street northbound leading left-turn/through phase. Phase 2 allows Main Street northbound/southbound traffic to move together. Phase 3 consists of a push-button actuated pedestrian phase, and Phase 4 allows all movements from Florence Street eastbound.

Main Street/Salem Street/Ferry Street is a signalized intersection with four approaches. The Main Street eastbound approach consists of a nine-foot exclusive left-turn lane and a 15-foot general lane. The Salem Street westbound approach consists of one unmarked 20-foot travel lane that functions as two travel lanes, primarily to allow right-turning vehicles to by-pass a queue. The Ferry Street northbound approach consists of one unmarked 19-foot travel lane that functions as a shared left-turn/through lane and exclusive right-turn lane. The Main Street southbound approach consists of a 17-foot left-turn/through lane and a 19-foot channelized right-turn lane. Crosswalks are provided across all legs of the intersection. One-hour parking is provided along the Ferry Street northbound approach, along the Salem Street eastbound departure, and along the Main Street westbound departure. A bus stop is located along the Main Street southbound approach. The signal operates in three phases. The first phase allows Main Street eastbound left-turning and through traffic to move along with a Main Street southbound right-turn overlap. The second phase allows through traffic on Main Street eastbound and all movements from Salem Street westbound to move. The last phase combines the movements of Ferry Street northbound and Main Street southbound. Pedestrians are accommodated with concurrent pedestrian phases.

Main Street/Pleasant Street is a signalized intersection with two approaches. The Main Street northbound approach consists of a 12-foot exclusive left-turn lane and a 13-foot through lane. The Main Street southbound approach consists of an unmarked 18-foot travel lane which acts as a through lane and a right-turn lane. Pleasant Street runs one-way westbound (away from the intersection). Crosswalks are provided across all legs of the intersection, and pedestrians are accommodated with an exclusive pedestrian phase. Citizens Bank, which is located on the east side of the intersection, has an entrance driveway along the Main Street northbound departure, approximately 35 feet north of the crosswalk across the northern leg of Main Street, and an exit driveway just north of the crosswalk across the southern leg of Main Street. These driveways were not included in traffic analysis presented in this report because they are not controlled by the traffic signal. The signal has only two phases: Main Street northbound/southbound phase and an exclusive pedestrian phase.

Main Street/Exchange Street is a signalized intersection with three approaches. The Exchange Street eastbound approach consists of a 26-foot unmarked travel lane which acts as an exclusive left-

turn lane and a through/right-turn lane. The Main Street northbound approach consists of a 12-foot through lane and a 12-foot through/right-turn lane. The Main Street southbound approach consists of an 11-foot shared left-turn/through lane and an 11-foot through lane. Exchange Street runs one-way eastbound, and turns into Irving Street east of the intersection, which also runs one-way eastbound. Crosswalks are provided across all legs of the intersection, and pedestrians are accommodated with an exclusive pedestrian phase. On-street parking is provided on both sides of the northern leg of Main Street, on both sides of Exchange Street, and on both sides of Irving Street in the vicinity of the intersection. The intersection is located just 200 feet south of Pleasant Street and just 200 feet north of Centre Street. The signal phasing at the intersection consists of a Main Street northbound/southbound phase, an Exchange Street eastbound phase, and an exclusive pedestrian phase.

Main Street/Centre Street is a signalized intersection with four approaches. The Centre Street eastbound approach consists of a 10-foot wide exclusive left-turn lane, a 12-foot wide through lane, and a 12-foot wide shared through/right-turn lane. The Centre Street westbound approach consists of an 11-foot wide exclusive left-turn lane, a 12-foot through lane, and a 12-foot shared through/right-turn lane. The Main Street northbound approach consists of a 10-foot wide exclusive left-turn lane, a 12-foot wide through lane, and a 12-foot wide shared through/right-turn lane. The Main Street southbound approach consists of an 11-foot wide left-turn lane, an 11-foot through lane, and an 11-foot shared through/right-turn lane; the left-turn lane and through lane are separated by a channelizing painted gore island. Crosswalks are provided across all legs of the intersection, and pedestrians are accommodated with concurrent pedestrian phases. On-street parking is not provided in the vicinity of the intersection. The signal phasing at the intersection consists of a Main Street northbound/southbound phase, followed by a Centre Street leading left-turn and through phase, followed by a Centre Street eastbound/westbound phase during which left turns are permitted, followed by an extended all-red phase, during which no vehicles or pedestrians are given the right of way. This phase, possibly an exclusive pedestrian phase that was replaced with concurrent phasing but not entirely removed, greatly impacts the efficiency of the traffic signal. Pedestrians were observed crossing the intersection during this phase.

Florence Street/Washington Street is a signalized intersection with four approaches. The Florence Street eastbound approach consists of a 12-foot shared left-turn/through lane and an 11-foot shared through/right-turn lane. The Florence Street westbound approach consists of a 10-foot exclusive left-turn lane, an 11-foot through lane, and a 12-foot shared through/right-turn lane. The Washington Street northbound approach consists of a 12-foot shared left-turn/through lane and an 11-foot exclusive right-turn lane. The Washington Street southbound approach consists of an 11-foot shared left-turn/through/right-turn lane. Crosswalks are provided across all legs of the intersection, and pedestrians are accommodated with concurrent pedestrian phases. On-street parking is provided on

the west side of the southern leg of Washington Street for Malden Senior Center visitors only. The signal phasing at this intersection consists of a Washington Street northbound phase, followed by a Florence Street eastbound/westbound phase, an exclusive pedestrian phase, and a Washington Street southbound phase.

Pleasant Street/Dartmouth Street/Middlesex Street is an unsignalized intersection with two approaches. The Pleasant Street westbound approach consists of an approximately 11-foot wide shared through/right-turn lane along with a bike lane. The Middlesex Street northbound approach consists of a shared left-turn/through lane. Crosswalks and curb-ramps exist across the Middlesex Street, Dartmouth Street, and western Pleasant Street legs of the intersection; however, the crosswalks are in poor condition.

Florence Street/Ramsdell Road is an unsignalized intersection with three approaches. The Florence Street eastbound approach consists of an 11-foot shared left-turn/through lane and an 11-foot through lane. The Florence Street westbound approach consists of an 11-foot through lane and a 12-foot shared through/right-turn lane. The Ramsdell Road southbound approach consists of an approximately 13-foot shared left/right-turn lane. Crosswalks and curb ramps are provided across the Ramsdell Road leg of the intersection.

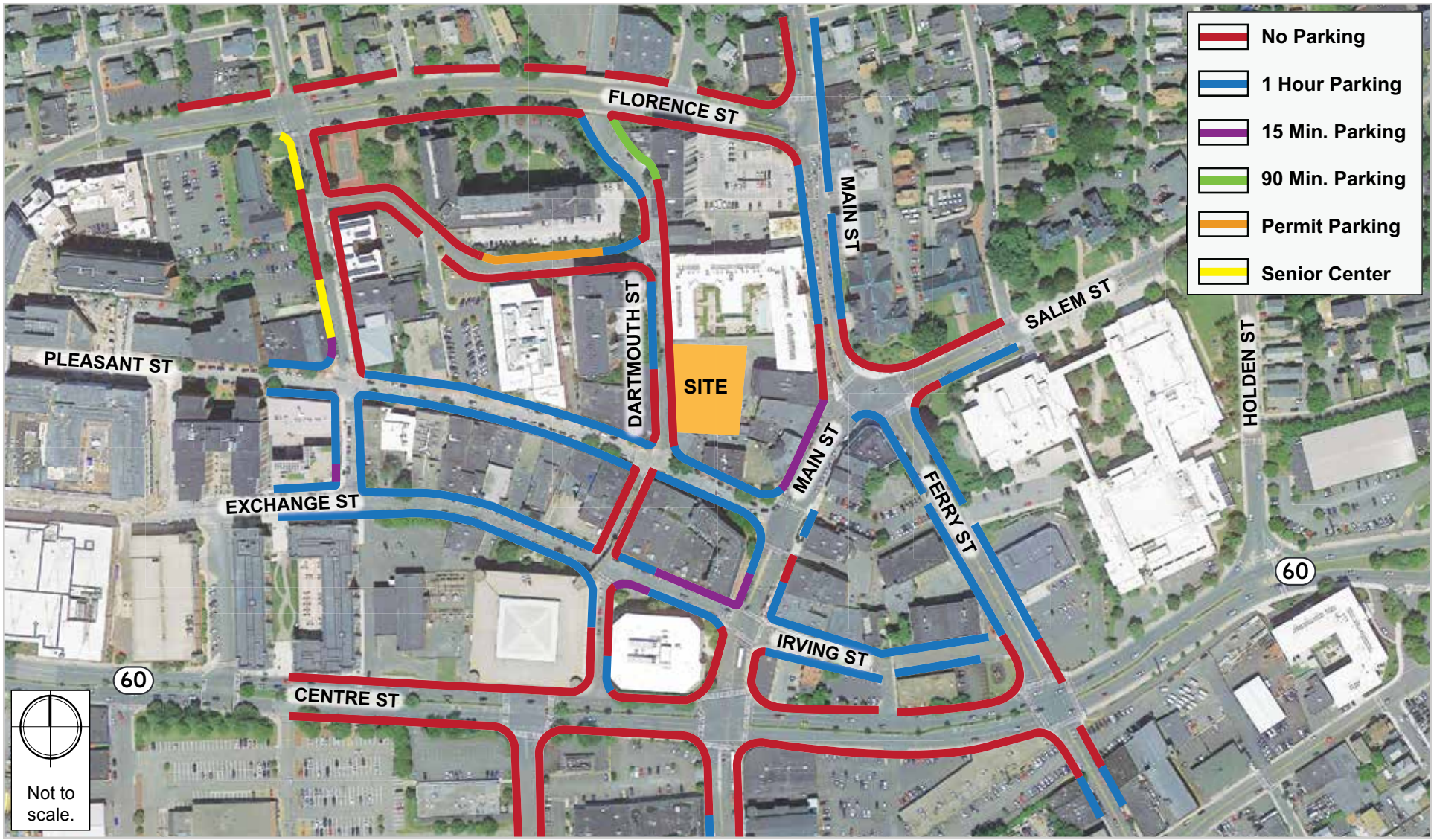
Dartmouth Street/Ramsdell Road is an unsignalized intersection with three approaches. The Ramsdell Road westbound approach consists of an approximately 12-foot wide shared left/right-turn lane. The Dartmouth Street northbound approach consists of a 12-foot wide shared through/right-turn lane. The Dartmouth Street southbound approach consists of a 12-foot wide shared left-turn/through lane. Crosswalks and curb ramps are provided across the Ramsdell Road leg of the intersection.

Mountain Avenue/Dartmouth Street is an unsignalized intersection with three approaches. The Mountain Avenue eastbound approach consists of an 11-foot shared through/right-turn lane. The Mountain Avenue westbound approach consists of an 11-foot shared left-turn/through lane. The Dartmouth Street northbound approach consists of an approximately 13-foot shared left/right-turn lane. No crosswalks or curb ramps are provided at this intersection.

On-Street Parking and Curb Use

On-street parking is generally provided in proximity to the site. Pleasant Street, Exchange Street, Main Street, and sections of Dartmouth Street have metered parking with a one-hour time limit. On-street parking is restricted along the east side of Dartmouth Street, adjacent to the Project site. The nearby on-street parking and curb regulations are shown in **Figure 2**.

Figure 2. ***On-street Parking and Curb Use***



Existing Car Sharing Services

Car sharing enables easy access to short-term vehicular transportation. Vehicles are rented on an hourly or daily basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location.

Zipcar is the primary company in the greater Boston area car sharing market; however, other companies such as Turo and Getaround also operate within the City of Malden. There are currently four Zipcar locations with access to eight vehicles and two Turo vehicles in the vicinity of the Project site. The nearby car sharing services are shown in **Figure 3**.

Existing Traffic Condition

TRAFFIC DATA COLLECTION

Turning movement counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and p.m. peak periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively). The TMCs included automobile, truck, pedestrian, and bicycle movements. The traffic volume data for six study area intersections were collected on Tuesday, January 28, 2020, and the remaining four study area intersections were collected on Thursday March 5, 2020. Within the data collection periods, the peak hour was generally identified as 7:30 – 8:30 a.m. and 4:45 – 5:45 p.m. The detailed traffic counts are provided in **Appendix A.**

SEASONAL ADJUSTMENT

It is standard practice to adjust traffic count data by a seasonal factor to obtain average annual volumes. To account for seasonal variation in Malden traffic, the study team reviewed MassDOT's weekday seasonal adjustment factor for Group U4-7 (Urban Minor Arterials, Major and Minor Collectors, and Local Roads and Streets). The seasonal adjustment factors for January and March are 1.06 and 1.02, respectively. This indicates that average vehicular volumes are 6% lower in January and 2% lower in March than the annual average. A 6% seasonal adjustment factor was applied to the intersections counted in January and a 2% seasonal adjustment factor was applied to the intersections counted in March. The seasonal adjustment factors were applied as a conservative measure for the analysis to reflect a worst-case scenario.

EXISTING VEHICULAR TRAFFIC VOLUMES

The Existing (2020) Condition traffic volumes for the weekday a.m. and p.m. peak hours are shown in **Figure 4** and **Figure 5**, respectively.

Figure 3. ***Car Sharing Locations***

Figure 4. ***Existing Condition Traffic Volumes, Weekday a.m. Peak Hour***

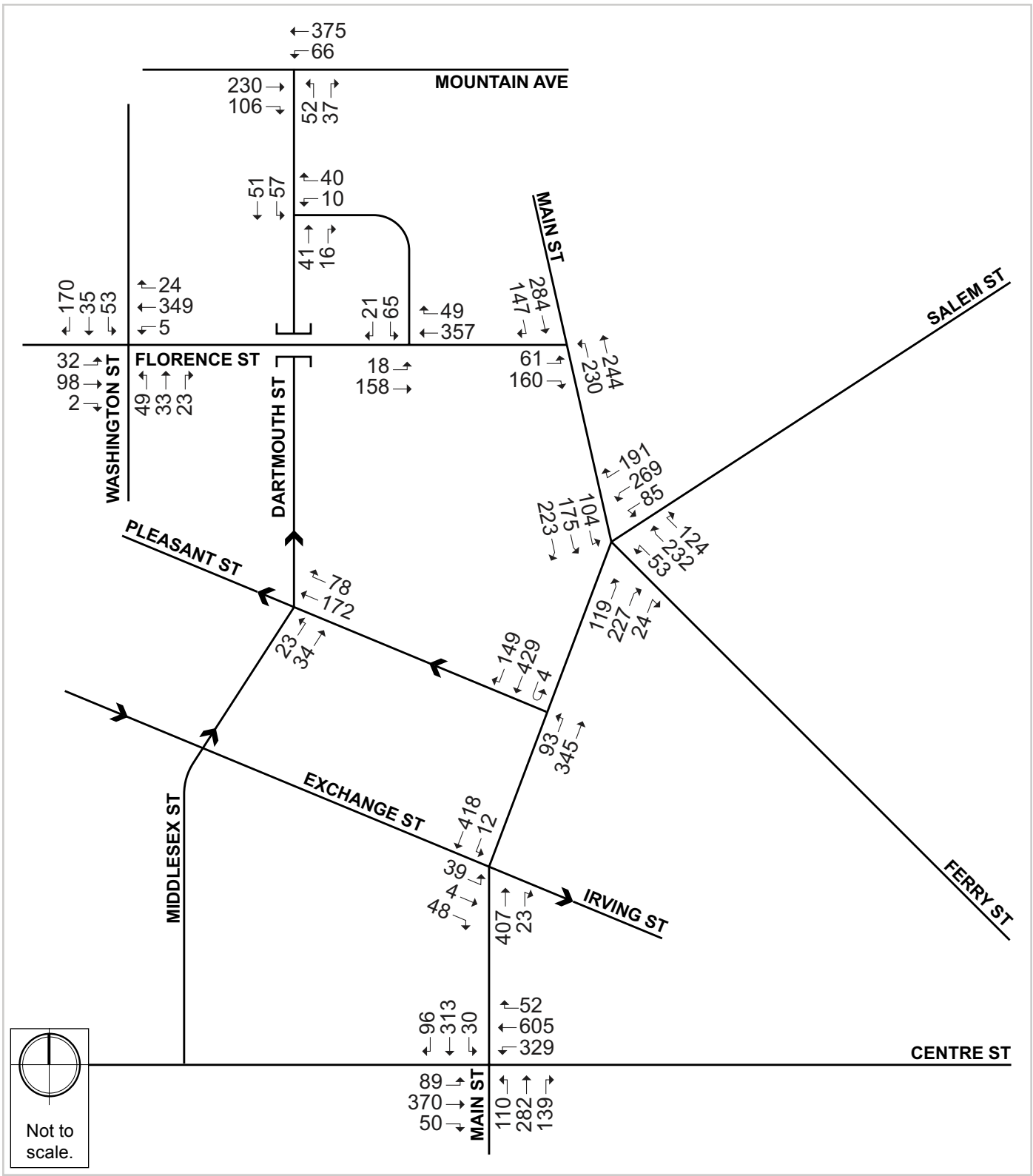
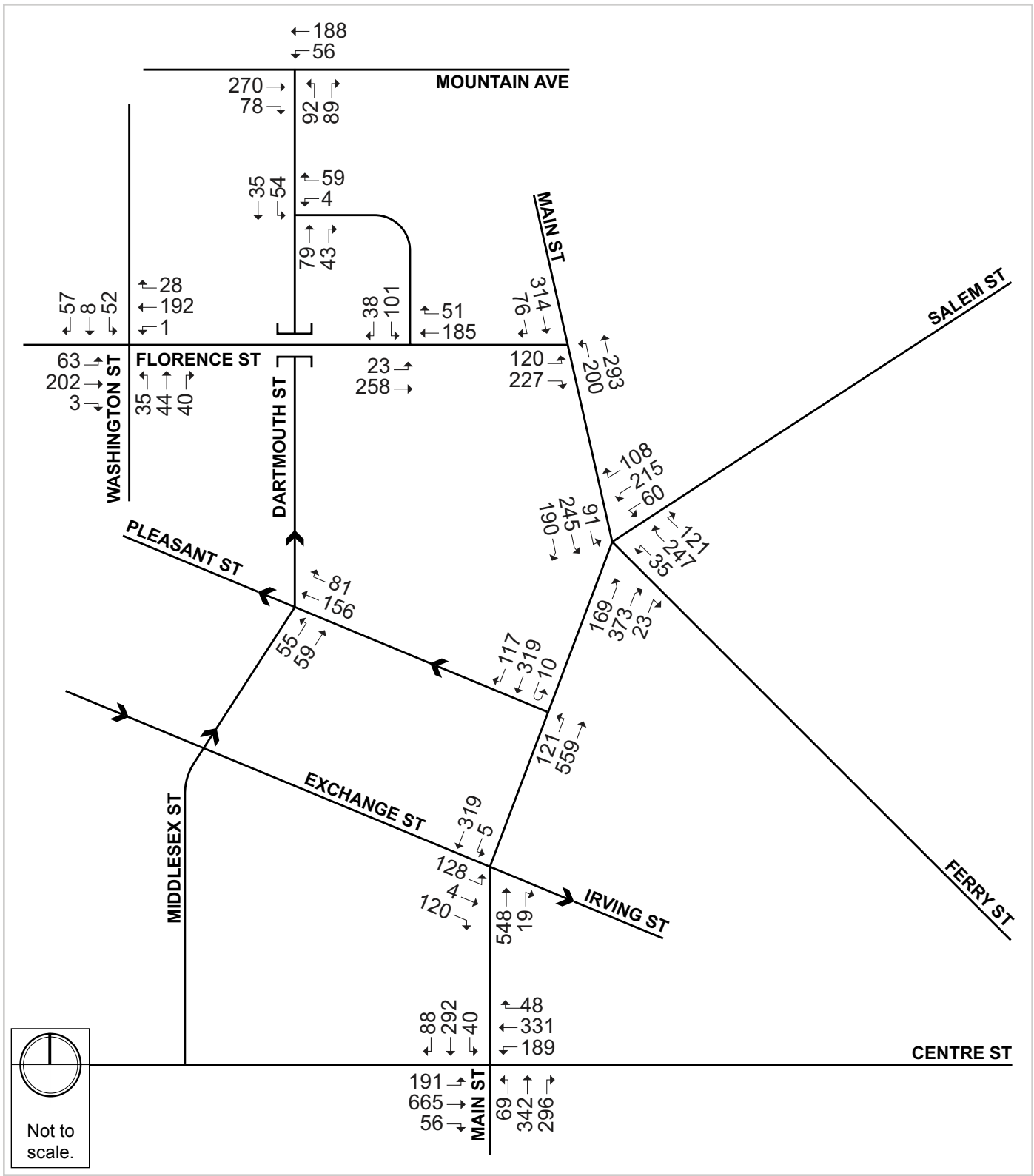


Figure 5. ***Existing Condition Traffic Volumes, Weekday p.m. Peak Hour***



Crash History

The crash data was used to understand safety conditions at the study intersections. The MassDOT IMPACT Portal was used to obtain crash data from the most recent three years of available data, which included data between 2015-2017. While the most recent year of complete crash data is 2017, the IMPACT Portal is updated daily with data that MassDOT considers incomplete as the records have not been verified or closed by all municipal police departments across the Commonwealth.

In MassDOT District 4, where the Project site is located, the average number of crashes is 0.73 crashes per million entering vehicles (MEV) at signalized intersections and 0.57 crashes per MEV at unsignalized intersections. **Table 1** shows the summary information on crashes, including the number per location and the associated crash rates. Crash rate worksheets are provided in **Appendix B.**

Table 1. Crash History at Study Area Intersections, 2015-2017

Characteristic	Main St./ Florence St.	Main St./ Ferry St./ Salem St.	Main St./ Pleasant St.	Main St./ Exchange St.	Main St./ Centre St.	Florence St./ Washington St.	Dartmouth St./ Pleasant St./ Middlesex St.	Mountain Ave./ Dartmouth St.
Year								
2015	3	6	4	4	11	3	3	4
2016	2	9	3	4	18	2	1	3
2017	2	8	6	1	18	1	0	1
Crash Severity								
Property Damage Only	4	8	6	4	29	3	4	3
Injury	2	1	1	1	12	2	0	1
Fatality	0	0	0	0	0	0	0	0
Other/Not Reported	1	14	6	1	6	1	0	4
Crash Type								
Angle	2	6	1	2	16	4	2	3
Rear-end	4	4	5	3	15	1	1	0
Sideswipe	0	10	3	2	4	0	1	1
Pedestrian/Cyclist	1	1	1	1	4	0	0	0
Parked/Fixed Object	0	1	3	0	5	1	0	1
Other/Not Reported	0	1	0	1	3	0	0	3
Pavement Condition								
Dry	6	17	8	6	32	4	4	5
Wet	0	4	1	1	8	0	0	1
Snow/Ice	1	0	1	1	4	2	0	2
Other/Not Reported	0	2	3	1	3	0	0	0
Total Crashes	7	23	13	9	47	6	4	8
Crash Rate [1]	0.50	1.01	1.01	0.69	1.57	0.68	0.99	0.85
District Average	0.73 signalized						0.57 unsignalized	

[1] *Crash rate = Crashes per million entering vehicles*
Shading indicates a crash rate higher than district average
The unsignalized intersections of Florence Street/Ramsdell Road and Dartmouth Street/Ramsdell Road had zero crashes reported between 2015-2017.

Five intersections exceed the District 4 average crash rates for signalized or unsignalized intersections.

- The signalized intersection of Main Street/Ferry Street/Salem Street has a crash rate of 1.01 per MEV. Of the 23 crashes reported, the most common types were sideswipe crashes. One crash resulted in an injury, and one crash involved a pedestrian.
- The signalized intersection of Main Street/Pleasant Street has a crash rate of 1.01 per MEV. Of the 13 crashes reported, the most common type of crashes were rear end crashes. One crash resulted in an injury, and one involved a pedestrian.
- The signalized intersection of Main Street/Centre Street has a crash rate of 1.57 per MEV. Of the 47 crashes reported, the most common types were angle and rear-end crashes. Twelve resulted in an injury, and three involved a pedestrian.
- The unsignalized intersection of Pleasant Street/Dartmouth Street/Middlesex Street has a crash rate of 0.99 per MEV. The high crash rate at this location is a result of the low vehicle volumes, as the crash rate indicates a comparison between the number of vehicles traveling through the intersection compared to the number of crashes. Of the four crashes reported, the most common type was an angle crash. There were not any crashes that resulted in an injury nor that involved a pedestrian.
- The unsignalized intersection of Mountain Avenue/Dartmouth Street has a crash rate of 0.85 per MEV. Of the eight crashes reported the most common was an angle crash. This could be the result of limited sight distance on Dartmouth Street due to the uphill grade as one approaches Mountain Avenue as well as the on-street parking on both streets. One crash resulted in an injury.

Existing Pedestrian and Bicycle Conditions

Pedestrian infrastructure is available throughout the study area as well as some bicycle accommodations. Sidewalks are generally provided along both sides of every roadway. Crosswalks are provided across all approach legs of signalized intersections as well as across most legs of unsignalized intersections. A crosswalk is not provided across Florence Street at Ramsdell Road; however, pedestrians can use Dartmouth Street for a grade separated route. In December 2013, Malden implemented a pedestrian wayfinding signage program to guide pedestrians and encourage pedestrian activity in Malden Center and throughout Malden. A bike lane is provided on Pleasant Street.

Pedestrian and bicycle volumes were collected concurrently with the vehicular TMCs and are presented in **Figure 6** and **Figure 7**, respectively. Pedestrian activity is high along Main Street and Dartmouth Street. Since the data was collected in January and March, bicycle and pedestrian volumes may be low as pedestrian and bicycle activity is typically higher during the warmer months.

Figure 6. ***Existing Pedestrian Volumes, Weekday a.m. and p.m. Peak Hours***

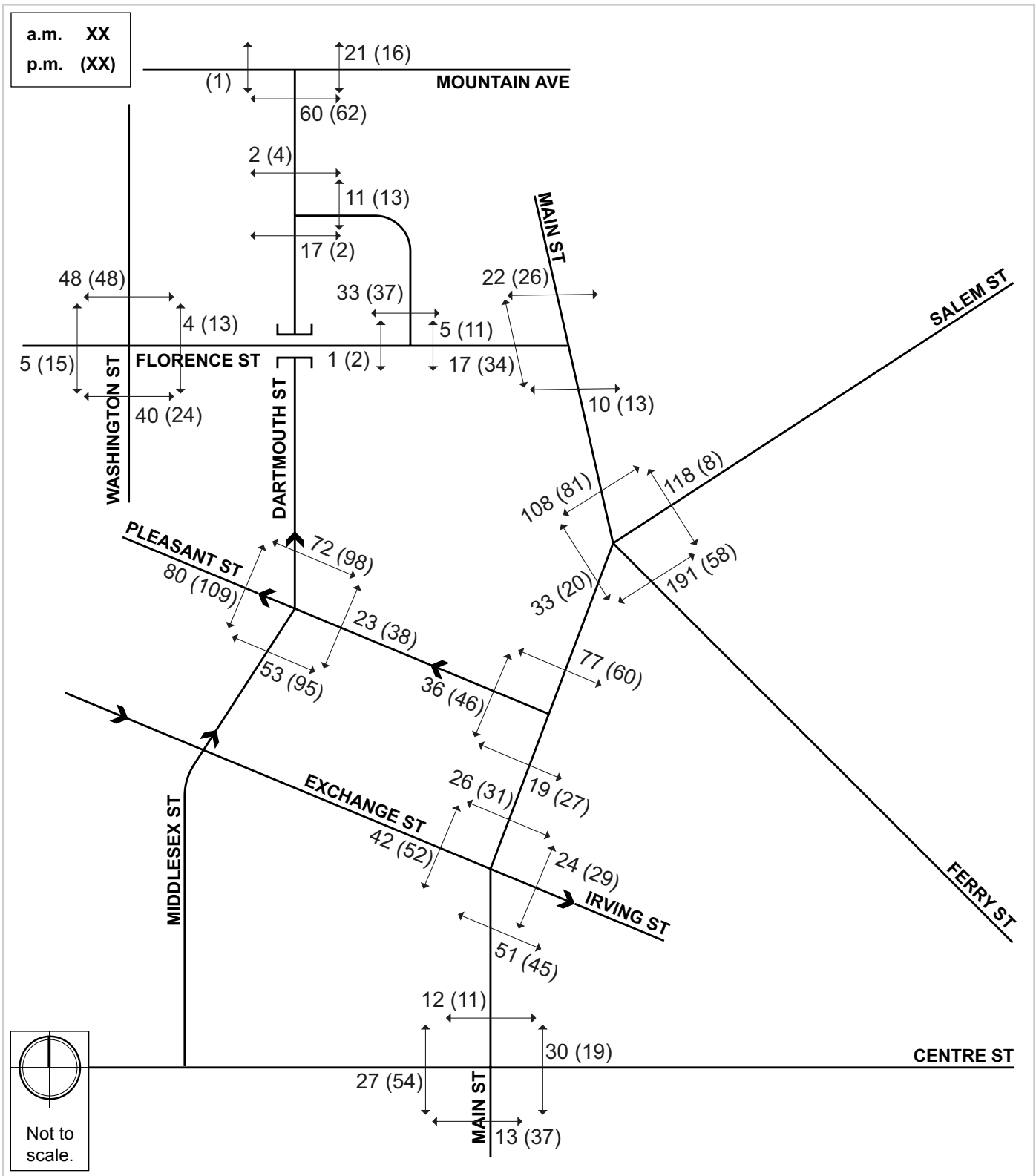
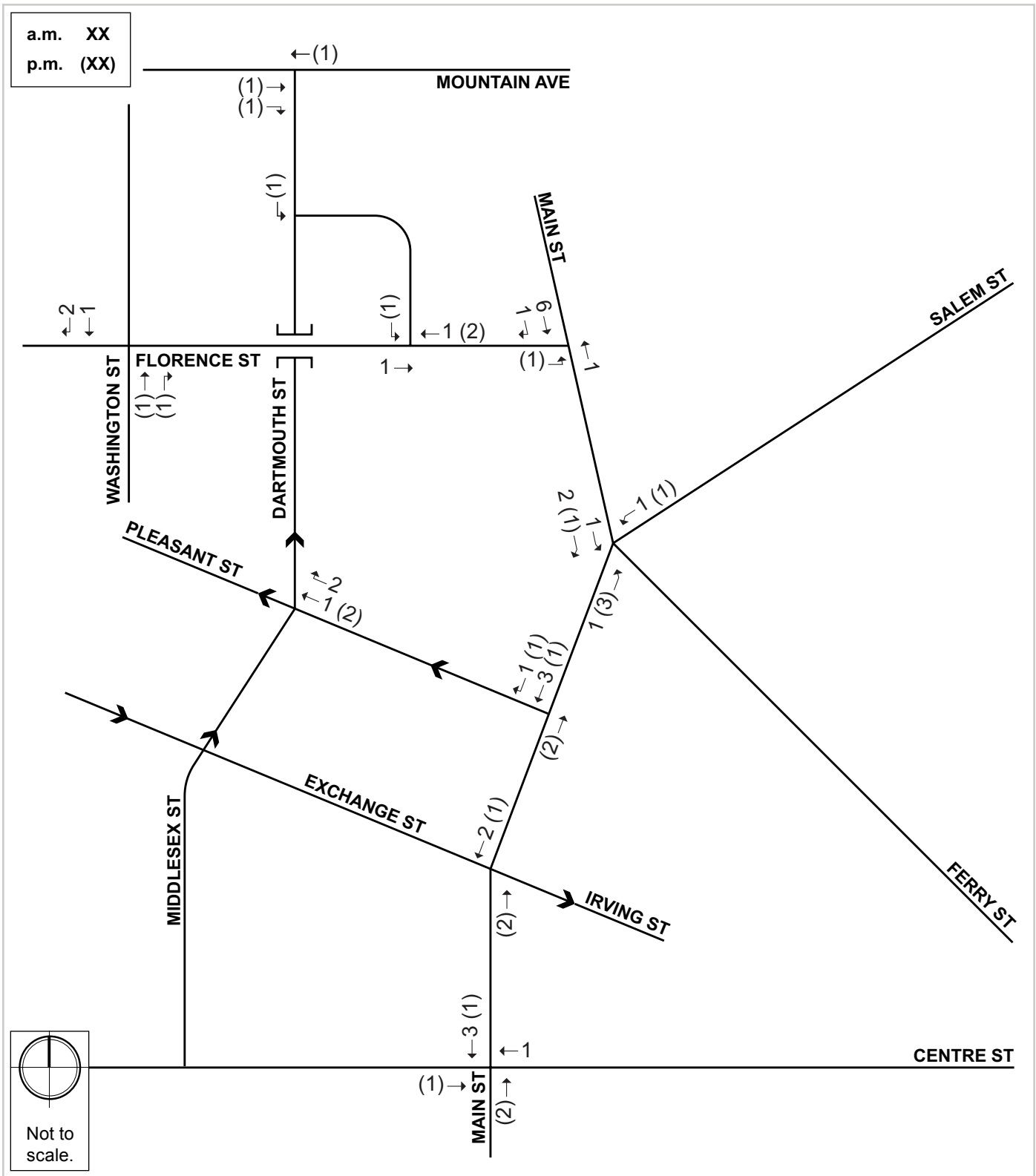


Figure 7. ***Existing Bicycle Volumes, Weekday a.m. and p.m. Peak Hours***



Existing Public Transportation

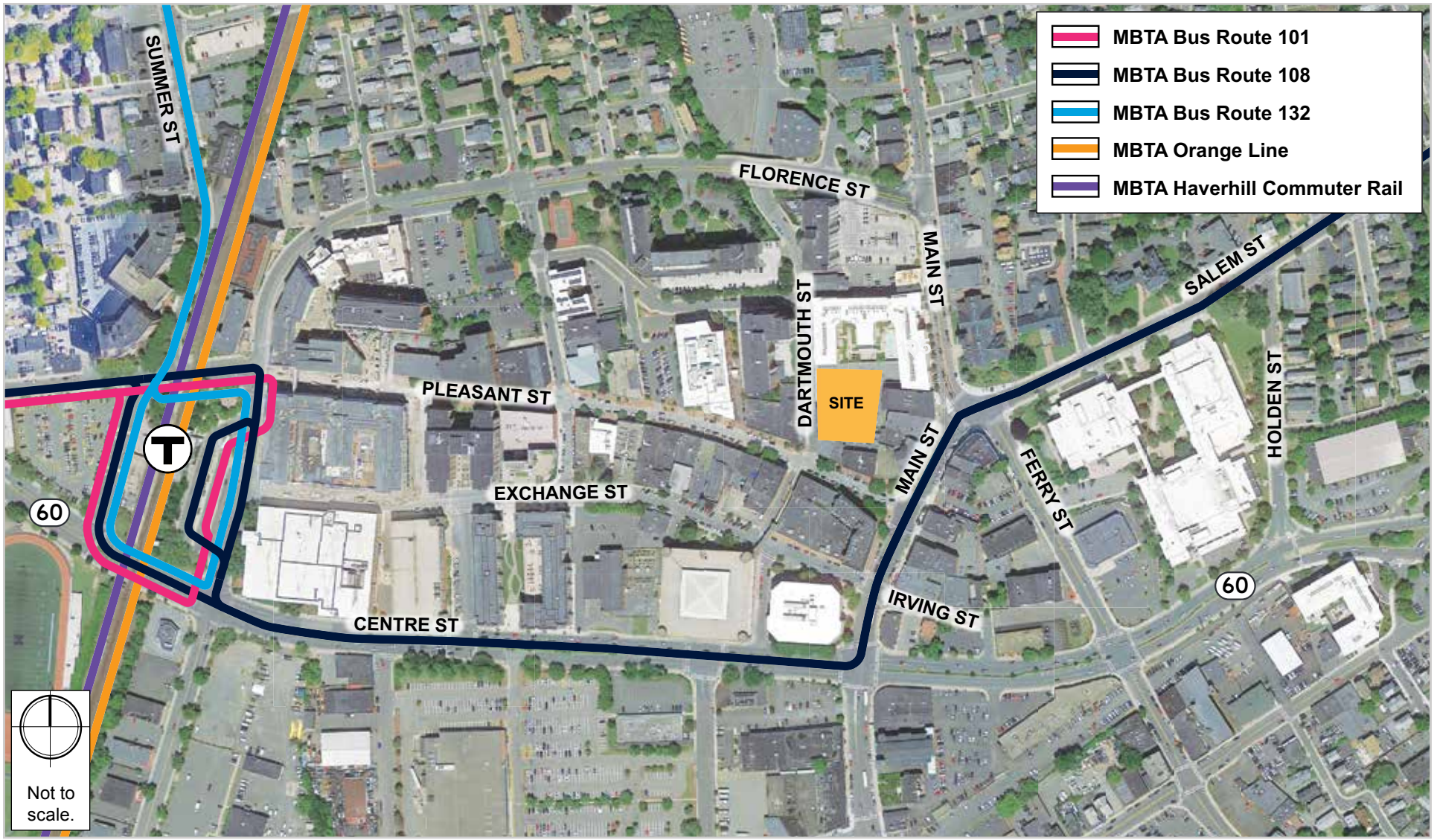
Downtown Malden is served by a wide variety of Massachusetts Bay Transportation Authority (MBTA) public transportation options, including the Orange Line, the Haverhill commuter rail line, and many bus routes. The Project site is located within one-half mile (10-minute walk) of the Malden Center MBTA station. The services provided at the Malden Center MBTA station are summarized in **Table 2** and mapped in **Figure 8**. The transit-oriented nature of the Project site will allow office workers to rely on public transportation and reduce the need for automobile use.

Table 2. MBTA Transit Service in the Study Area

Route	Description	Peak Hour headway (minutes)[1]
Haverhill Line	Haverhill to North Station	30-73
Orange Line	Oak Grove–Forest Hills	5
Route 97	Malden Center Station - Wellington Station	30
Route 99	Boston Regional Medical Center- Wellington Station	40
Route 101	Malden Center Station - Sullivan Square Station	6-20
Route 104	Malden Center Station - Sullivan Square Station	14-30
Route 105	Malden Center Station - Sullivan Square Station	30-65
Route 106	Lebanon Street, Malden/Franklin Square-Wellington Station	20-30
Route 108	Linden Square - Wellington Station	10-30
Route 132	Redstone Shopping Center - Malden Station	30
Route 136	Reading Depot - Malden Station	30-45
Route 137	Reading Depot - Malden Station	30-60
Route 411	Malden Center Station - Revere/Jack Satter House	25-60
Route 430	Saugus Center - Malden Center Station	35-40

1. *Headway is the time between vehicles. Source MBTA 2020.*

Figure 8. ***Existing Public Transportation***



No-Build (2027) Condition

For transportation impact analyses, it is standard practice to evaluate two future conditions: a No-build Condition (without the proposed project) and a Build Condition (if the project is built). Typically, these conditions are projected to a future date seven years from the expected date of filing, which is known as the Existing Condition year. For this study, the year 2027 has been designated as the future year.

The traffic volumes under the No-build Condition are independent of the proposed Project and include existing traffic plus new traffic resulting from general background growth and any new projects in the area that have been identified by the City of Malden.

Background Traffic Growth and Other Developments

A general background growth rate accounts for changes in demographics, auto usage, auto ownership, and non-specific, minor changes in land use within the study area. A 0.5% annual growth rate was applied to the existing intersection volumes over seven years to account for background growth by 2027.

The Malden Planning Department did not provide information relating to any specific developments within the downtown area; however, the following project has been incorporated into future conditions (in addition to the growth rate):

- ***Jefferson at Malden Center*** – This project includes the demolition of the existing Malden Government Center, which includes the Malden Police Station and the Malden City Hall, as well as an adjacent parcel housing the First Church in Malden Congregational Church. The Proposed project will be a mixed use, transit-oriented development, which will include residential apartments, retail space, office space, and supporting on-site parking. Additionally, the Project will reopen Pleasant Street to the Commercial Street/Florence Street intersection as well as increase the overall amount of public on-street parking by approximately 15 spaces. New project trips were obtained from the associated traffic impact study.

No-build Condition traffic volumes, which incorporate the background growth rate and additional trips associated with the above project, are shown in **Figure 9** and **Figure 10**.

Figure 9. *No-Build (2027) Condition Traffic Volumes, Weekday a.m. Peak Hour*

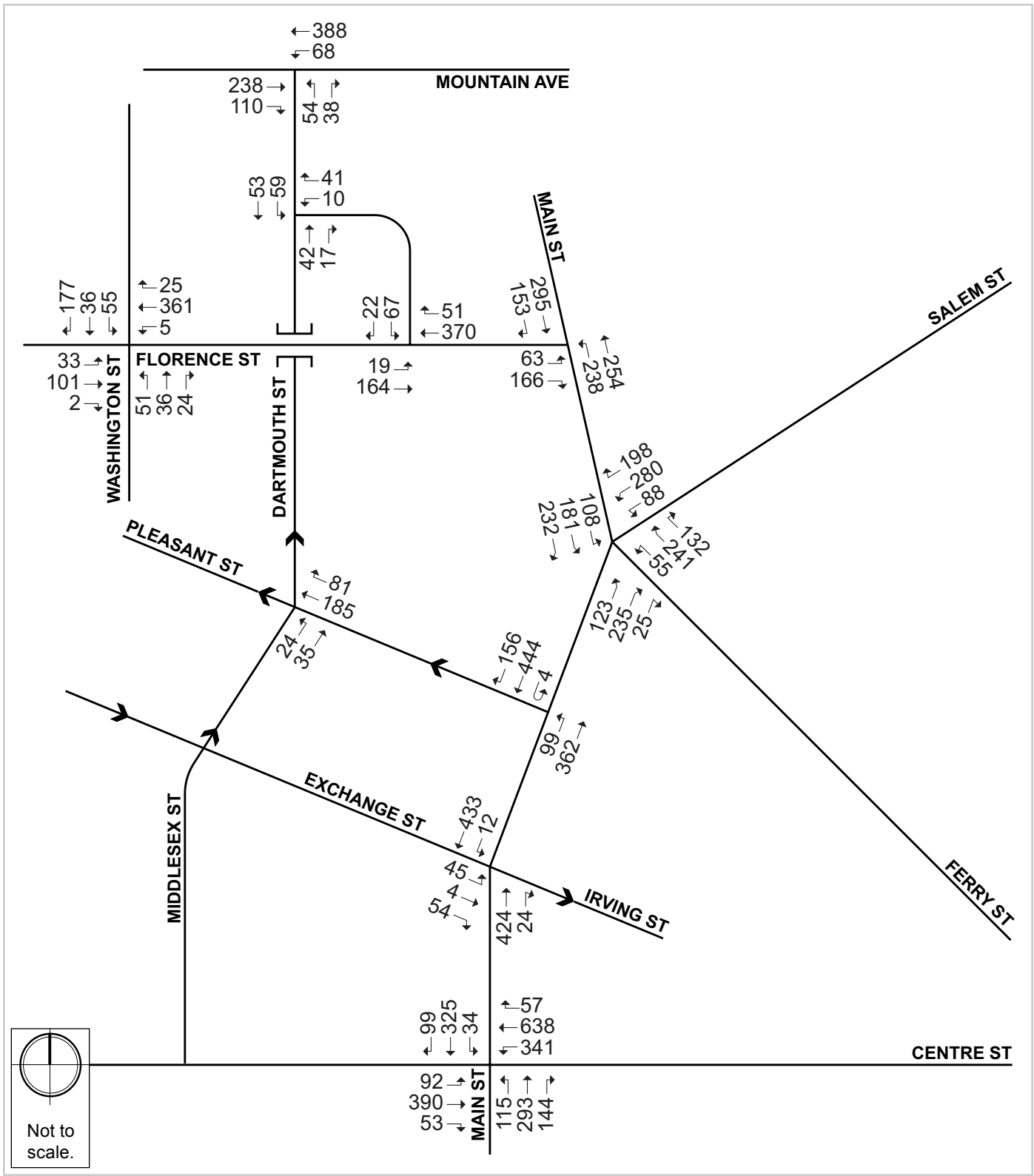
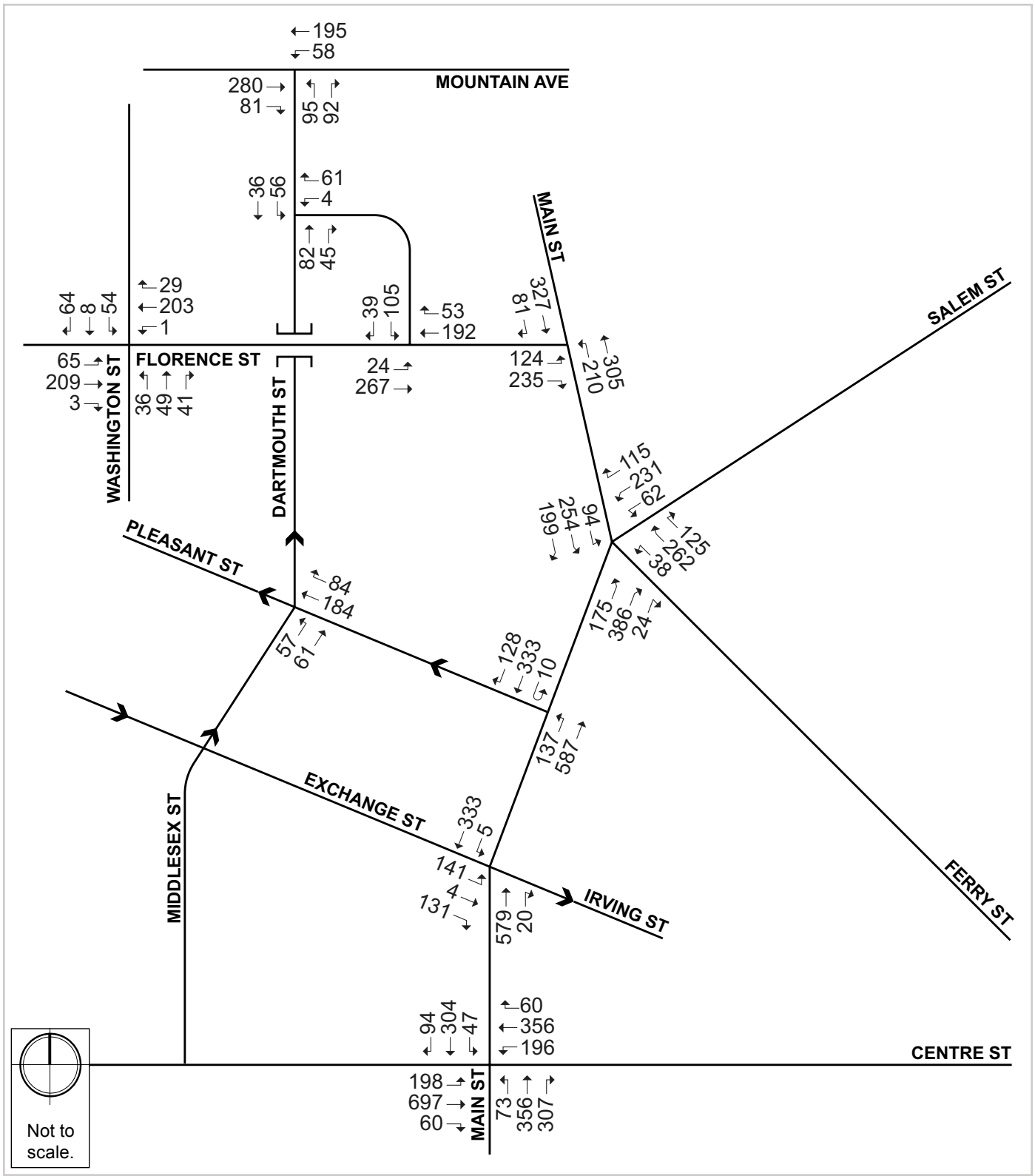


Figure 10. ***No-Build (2027) Condition Traffic Volumes, Weekday p.m. Peak Hour***



Other Transportation Improvements

The City of Malden has applied for a grant to make improvements to Dartmouth Street. The planned improvements include repaving, sidewalk and ADA ramp reconstruction, and restriping. Construction of these improvements is expected to commence later in 2020.

Build (2027) Condition

As previously mentioned, the Project will consist of the demolition of the existing structure and the construction of a new, nine-story, approximately 150,000-sf office building with an approximately 3,000 sf ground floor commercial component. The existing building consists of a three-story, approximately 17,000 sf office building (occupied by the Dartmouth Corporate Center), with a private parking lot. The Project will continue to utilize the existing private way to the north of the building. On-site parking will be in one underground garage level and one at-grade level and provide approximately 161 spaces to building tenants via the CityLift automated parking system.

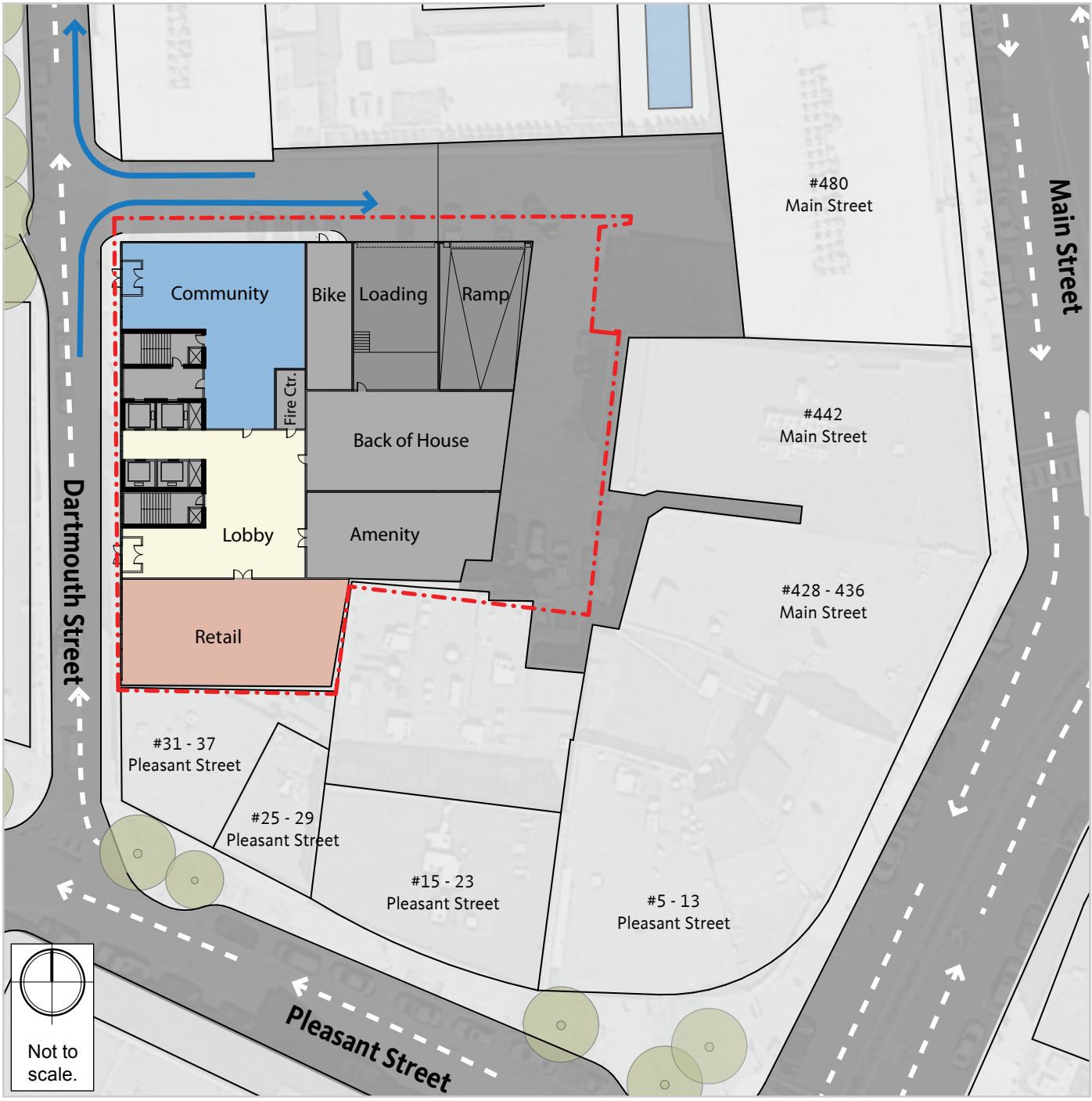
Site Access and Circulation

The vehicular access to the parking garage will continue to occur along the private roadway (Dartmouth Court) located to the north of the building through the existing curb cut along Dartmouth Street. A dedicated loading area will be provided along the rear of the building. A designated bicycle storage room will be provided on the ground floor for easy access to bicycles. The site plan for the proposed Project is shown in **Figure 11**.

Build Loading and Service Activity

All Project-related deliveries will occur in a dedicated off-street loading area that has been proposed along the east wall, near the southeast corner. The location of this loading area was chosen to minimize the impact along Dartmouth Street as well as at the Project's garage entrance. The loading area will be accessed via the existing curb cut along Dartmouth Street. All Project delivery activity will be managed by an on-site transportation coordinator.

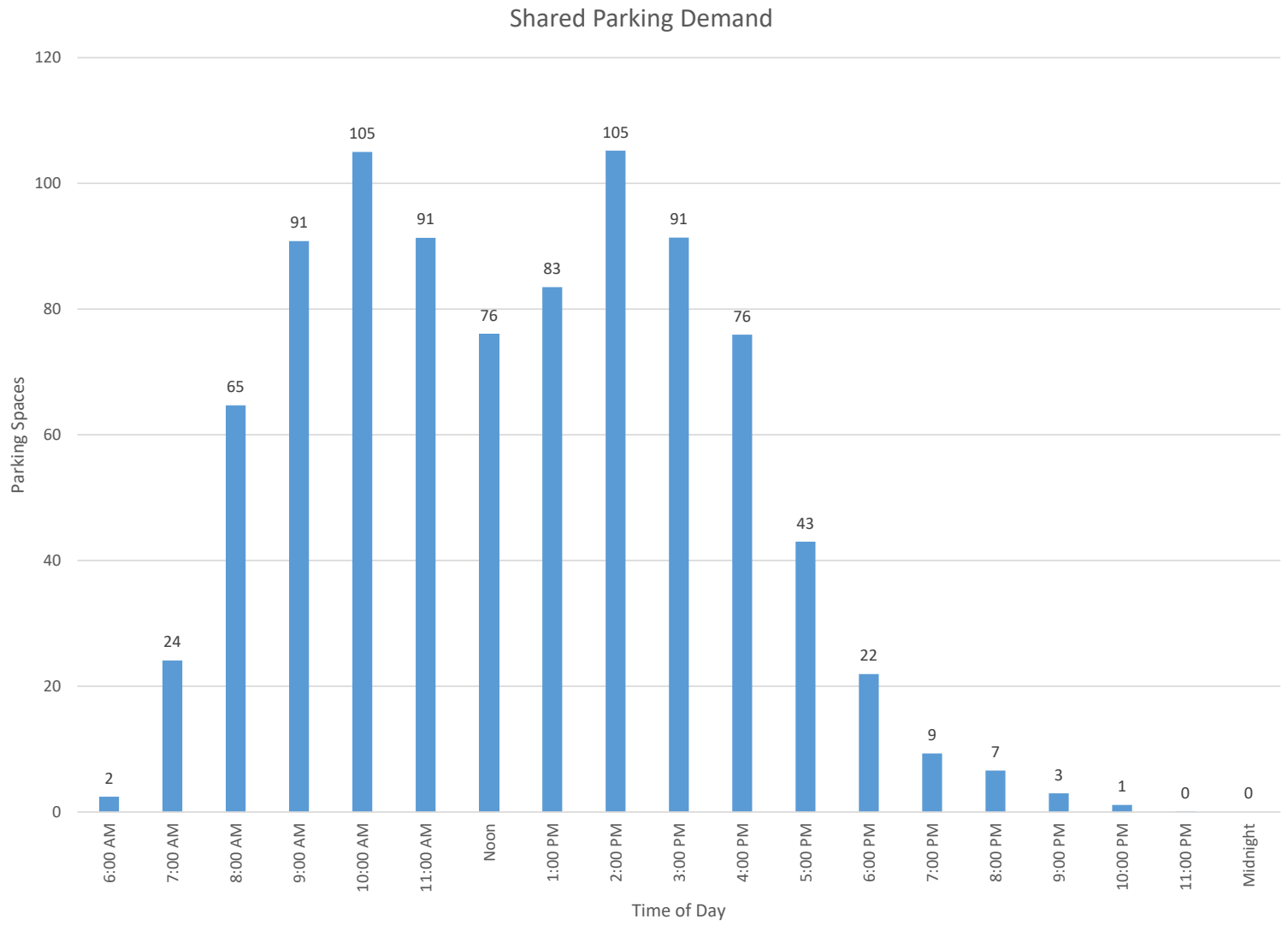
Figure 11. ***Site Plan***



Build Parking Condition

The Project has proposed to provide approximately 161 automated parking spaces in two garage levels, a rate of 1.07 spaces per 1,000 sf. Kendall Square in Cambridge, an area with aggressive programs for transportation demand management (TDM) measures, including limiting off-street parking, has an overall parking ratio of 0.1 spaces per 1,000 sf. While the Proponent is not proposing a parking ratio as aggressive as the Kendall Square neighborhood, the proposed parking ratio is reasonable in combination with the Proponent's proposed TDM measures as well as the types of businesses to whom the space will be marketed. A parking analysis has been completed using data derived from the Shared Parking Guidelines developed by the Urban Land Institute (ULI). The ULI guidelines provide parking occupancy factors such as maximum expected occupancy during each month of the year as well as time of day distributions for parking utilization. The analysis estimates that a maximum of 105 parking spaces will be utilized at two different times of the day, first at 9:00 a.m. and again at 2:00 p.m. A histogram depicting the estimated parking utilization through a typical day is shown in **Figure 12**. In addition, according to Section 500.2.8.1 of the City of Malden Zoning Ordinances, all allowed non-residential uses in the Central Business District are not required to conform with the off-street parking requirements.

Figure 12. ***Shared Parking Demand Analysis***



Project Trip Generation

TRIP GENERATION METHODOLOGY

Determining the future trip generation of the Project is a complex, multi-step process that produces an estimate of vehicle trips, transit trips, and walk/bicycle trips associated with a proposed development and a specific land use program. A project's location and proximity to different travel modes determines how people will travel to and from a site.

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[1] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel modes such as walking, bicycling, and transit. To estimate the unadjusted number of vehicular trips for the Project, the following ITE land use code (LUC) was used:

- **LUC 710** – General Use Office Building. A general office building houses multiple tenants and is a location where affairs of businesses, commercial, or industrial organizations are conducted. Calculations of the number of trips use ITE's average rate per 1,000 sf.
- **LUC 820** – Retail/Shopping Center. A retail/shopping center is an integrated group of commercial establishments that is planned, developed, owned and managed as a unit. A shopping center's composition is related to its market area in terms of size, location and type of store. Of the ITE retail categories, LUC 820 best suits the retail component proposed within the Project. Calculations of the number of trips use ITE's average rate per 1,000 sf.

TRAVEL MODE SHARES

Travel mode shares reflect the distribution of person trips among automobiles, transit services, and walking/bicycling. The American Census Survey (ACS) Table B08406 – Means of Transportation to Work for Workplace Geography provides work-based travel mode share rates for cities and towns in Massachusetts. The ACS data for the City of Malden was used to develop the travel mode share rates for the office land use. The office mode share was adjusted to reflect the transit-oriented nature of the Project based on other transit-oriented locations in the greater Boston area. The travel mode share rates for the retail use were adopted from other recent traffic studies in the downtown Malden area. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA); the person trips were then distributed to the mode share rates shown in **Table 3**.

[1] Trip Generation Manual, 10th Edition; Institute of Transportation Engineers; Washington, D.C.; 2017.

Table 3. Travel Mode Shares, Vehicle Occupancy, and Taxi Rate

Land Use	Travel Mode Share			Vehicle Occupancy	Taxi
	Walk/Bicycle	Transit	Auto		
Office	13%	21%	66%	1.18	3%
Retail	20%	10%	70%	1.82	0%

NET NEW VEHICLE TRIP GENERATION

As previously discussed, the site is currently occupied by the Dartmouth Corporate Center, a three-story office building housing approximately 17,000 sf of general office space. This land use generates a small amount of travel activity related to its office tenants and visitors. When assessing a site with existing active land uses, it is standard practice to estimate existing trips and subtract those trips from the projected new future trips. The result of this process yields "net new" trips that become the basis for traffic analysis.

Table 4 shows the vehicle trips associated with the existing land use to be removed from the site and the vehicle trips associated with the Project by land use. The resulting net new trips reflect the impact of the Project on the surrounding roadway network. Detailed trip generation calculation sheets for the existing site and proposed Project are contained in **Appendix C**.

Table 4. Net New Vehicle Trip Generation

Time Period/ Direction		Existing Trips	New Project Trips		Net New Trips
		Office (17,000 sf)	Office (150,000 sf)	Retail (2,850 sf)	
Daily	In	-57	508	37	488
	Out	-57	508	37	488
	Total	**-114**	**1,016**	**74**	**976**
a.m. Peak Hour	In	-11	101	2	92
	Out	-2	20	1	19
	Total	**-13**	**121**	**3**	**111**
p.m. Peak Hour	In	-2	22	3	23
	Out	-11	99	4	92
	Total	**-13**	**121**	**7**	**115**

Vehicle Trip Distribution

A vehicle trip distribution pattern identifies the various travel paths for vehicles arriving at a destination and the corresponding departure travel paths. New vehicle trips generated by the Project site will include mostly tenant employees and visitors to the businesses. The trip distribution for new Project trips was based on 2018 Census Journey to Work data, previous studies done in the Malden Center area, and knowledge of the roadway system in the area. **Figure 13** shows the trip distribution pattern for Project trips entering the site driveway on Dartmouth Street.

Build Traffic Operations

The distribution pattern was applied to the net new Project trips to develop the Project generated vehicle trips shown in **Figure 14** and **Figure 15**, for the a.m. peak hour and p.m. hour, respectively. Then the Project generated vehicle trips were added to the No-Build traffic volumes to develop the Build (2027) Condition traffic volumes, shown in **Figure 16** and **Figure 17** for the a.m. and p.m. peak hours, respectively.

Figure 13. ***Vehicle Trip Distribution***

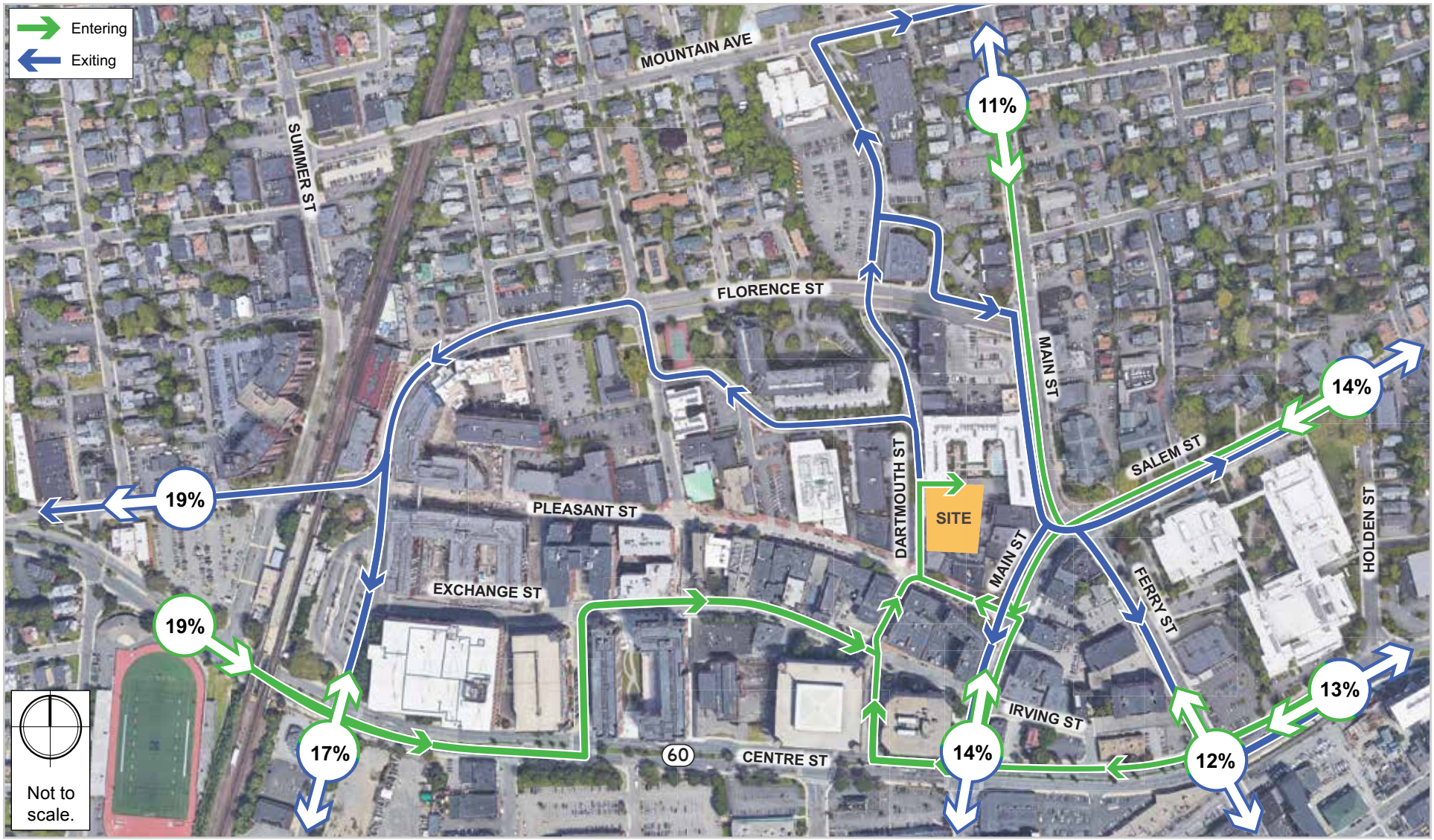


Figure 14. ***Net New Project-generated Trips, Weekday a.m. Peak Hour***

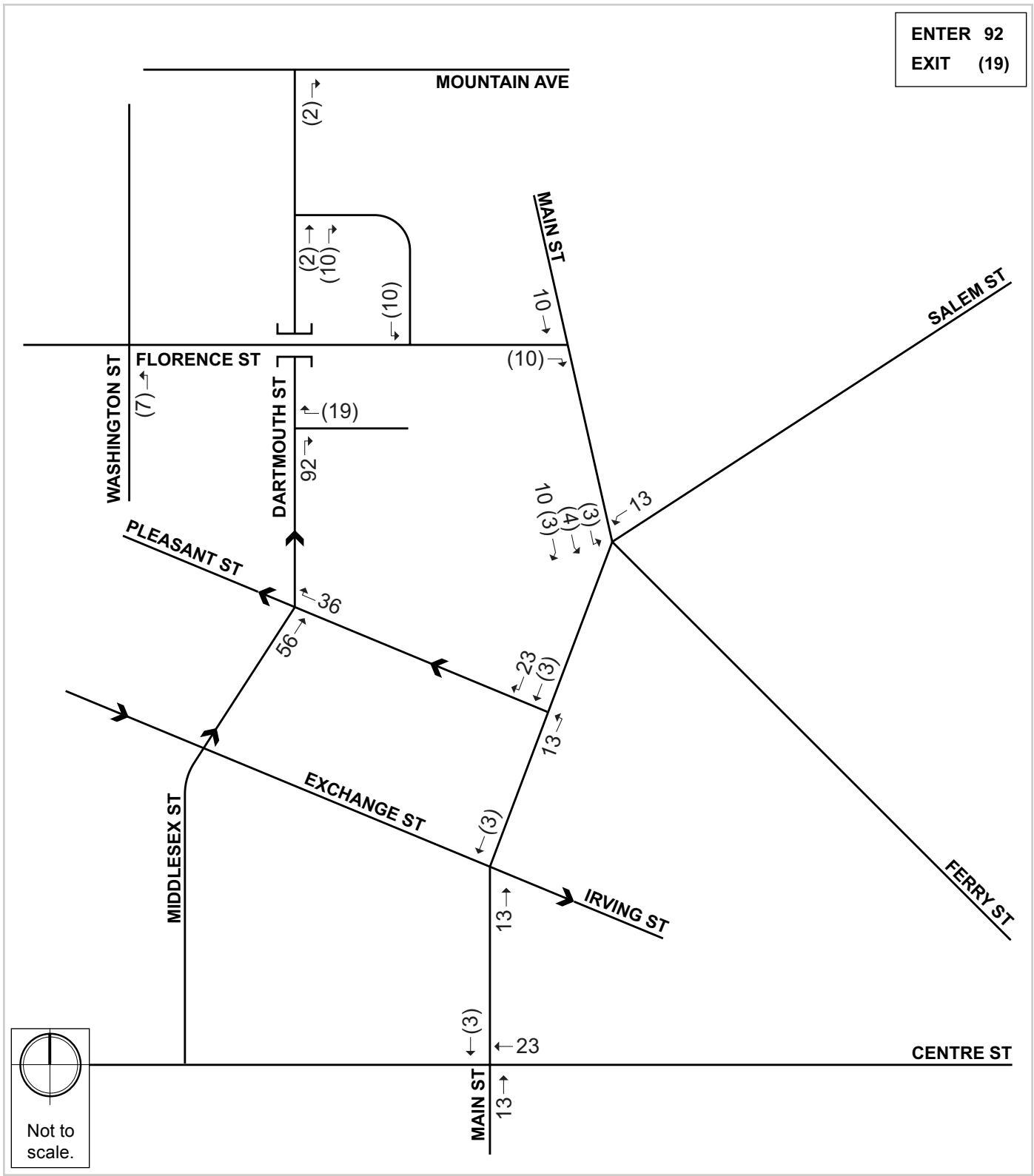


Figure 15. ***Net New Project-generated Trips, Weekday p.m. Peak Hour***

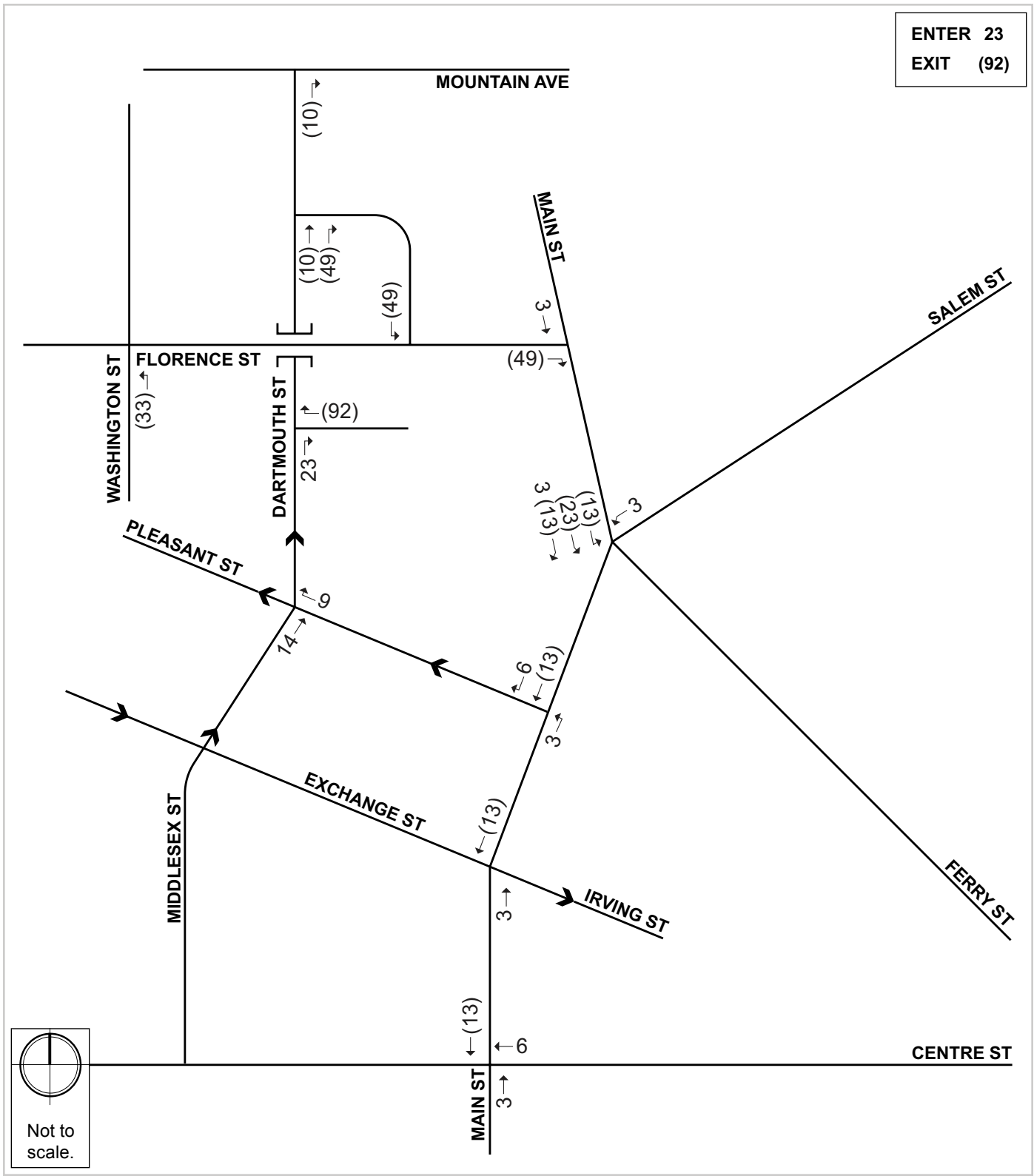


Figure 16. ***Build (2027) Condition Traffic Volumes, Weekday a.m. Peak Hour***

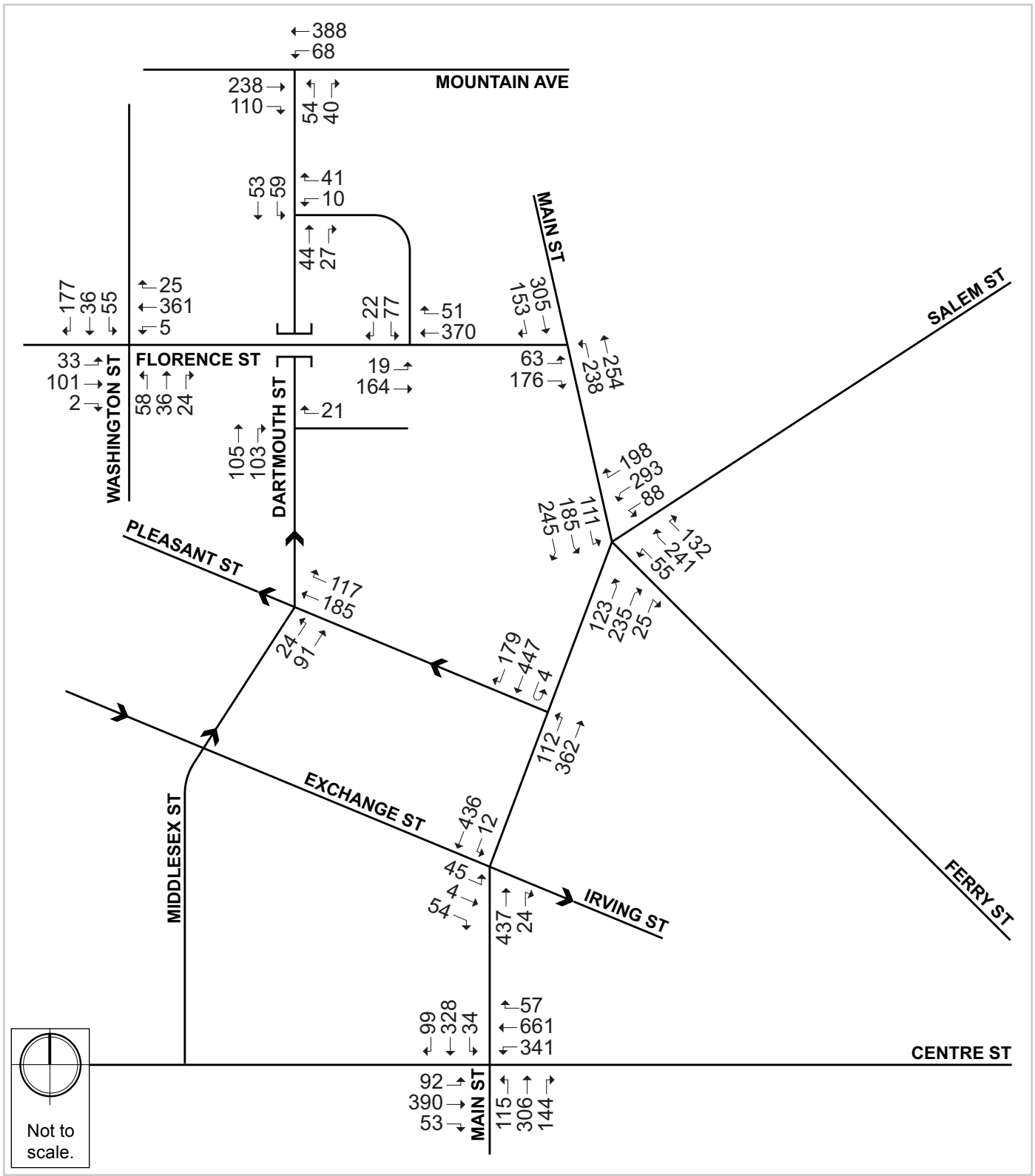
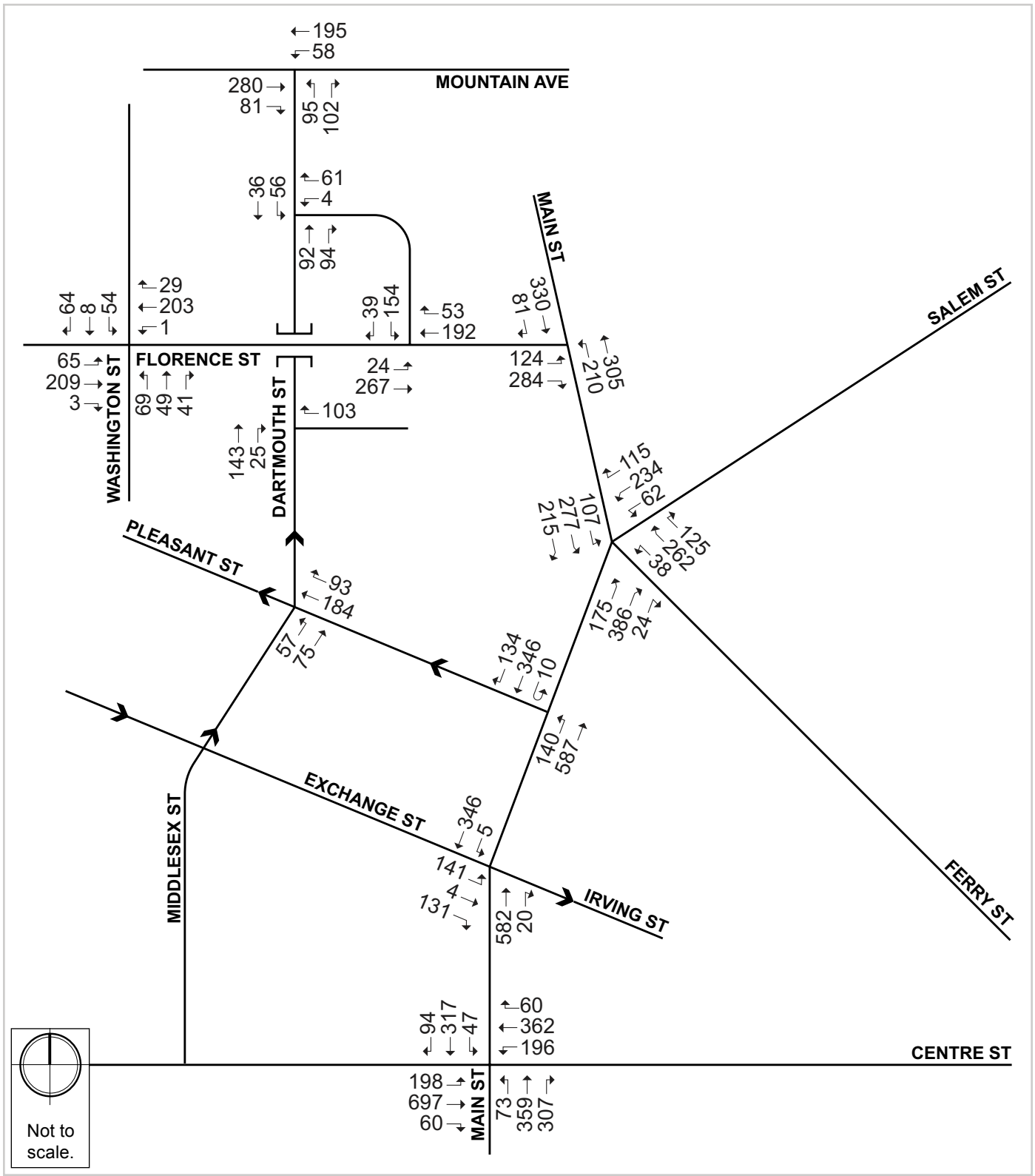


Figure 17. ***Build (2027) Condition Traffic Volumes, Weekday p.m. Peak Hour***



Traffic Operations Analysis

The traffic operations analysis is determined through the Level of Service (LOS) and volume to capacity (v/c) calculations which determine a resultant grade based on calculated modal delay, in seconds per vehicle. LOS and delay at the signalized and unsignalized intersections were calculated using Synchro 9.0, which is based on the traffic operational analysis methodology of Synchro. The intersection geometry and traffic volumes play critical roles in determining the LOS and delay. **Table 5** is an excerpt from the Highway Capacity Manual (HCM), which provides LOS criteria for signalized and unsignalized intersections. LOS A defines the most favorable condition, with minimum traffic delay. LOS F represents the worst condition, with significant traffic delay.

Table 5. Level of Service Criteria

Level of Service	Average Stopped Delay (sec./veh.)	
	Signalized Intersection	Unsignalized Intersection
A	0.0–10.0	0.0–10.0
B	10.1–20.0	10.1–15.0
C	20.1–35.0	15.1–25.0
D	35.1–55.0	25.1–35.0
E	55.1–80.0	35.1–50.0
F	>80.0	>50.0

Source: Highway Capacity Manual, 2010. Transportation Research Board.

In accordance with MassDOT guidelines, the peak 15 minutes of data collected during the peak hour were isolated to calculate the peak-hour factors for each approach. The percentage of heavy vehicles was a factor for each approach as well. The City of Malden provided all signal timings and offsets used in the Existing Conditions analysis. These were verified through field observations. Calibrations and factors used in the Synchro analysis are shown in **Table 6**.

Table 6. Synchro Adjustment Factors

Adjustment Factor	Notes
Vehicle Speed	Based on Posted Speed Limit
Area type	CBD Assumed
Right turn on red	Based on existing conditions
Conflicting peds/bikes	Based on TMC data
Peak-hour Factor	Based on TMC data by approach
Heavy vehicle %	Based on TMC data by movement

An analysis was performed to evaluate the traffic operations for the Existing (2020) Condition, the No-Build (2027) Condition, and the Build (2027) Condition. The traffic operations analysis for weekday a.m. and p.m. peak hours are shown in **Table 7** and **Table 8**, respectively. The detailed Synchro outputs are provided in **Appendix D**.

Table 7. Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection/ Movement	Existing (2020) Condition					No-Build (2027) Condition					Build (2027) Condition				
	LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length	
				50th (ft)	95th (ft)				50th (ft)	95th (ft)				50th (ft)	95th (ft)
Signalized Intersections															
Main St/Florence St	C	28.6	-	-	-	C	32.4	-	-	-	C	33.9	-	-	-
Florence EB L	C	34.7	0.32	26	78	C	34.8	0.32	27	80	C	34.8	0.32	27	80
Florence EB R	B	11.3	0.52	0	54	B	11.3	0.52	0	55	B	11.3	0.54	0	56
Main NB L/T	C	26.4	0.83	97	#491	C	33.8	0.89	120	#538	D	36.4	0.90	126	#548
Main SB T/R	D	37.1	0.81	151	#500	D	38.8	0.83	159	#524	D	40.4	0.85	165	#540
Main St/Ferry St/Salem St	D	44.7	-	-	-	D	47.8	-	-	-	D	49.0	-	-	-
Main EB L	F	134.2	1.05	~108	#194	F	145.9	1.09	~114	#201	F	148.5	1.10	~114	#201
Main EB T/R	B	17.3	0.31	106	137	B	18.4	0.32	111	142	B	19.2	0.33	111	142
Salem WB L	C	24.2	0.30	42	83	C	24.6	0.32	43	86	C	24.7	0.32	43	86
Salem WB T/R	D	45.4	0.87	304	#494	D	51.0	0.91	322	#524	E	55.6	0.94	335	#542
Ferry NB L/T	D	44.8	0.79	196	275	D	48.5	0.83	207	#312	D	48.1	0.83	208	#314
Ferry NB R	A	5.7	0.30	0	33	A	5.7	0.31	0	34	A	5.6	0.31	0	34
Main SB L/T	E	75.0	0.97	205	#340	E	77.0	0.98	215	#355	E	76.7	0.98	222	#364
Main SB R	B	16.4	0.30	97	139	B	16.5	0.31	102	145	B	16.6	0.33	109	153
Main St/Pleasant St	A	0.2	-	-	-	A	0.2	-	-	-	A	0.2	-	-	-
Main NB L/T | T	A	0.2	0.23	0	0	A	0.3	0.25	0	0	A	0.3	0.26	0	0
Main SB T | T/R	A	0.1	0.19	0	0	A	0.1	0.20	0	0	A	0.1	0.21	0	0
Main St/Exchange St/Irving St	A	4.5	-	-	-	A	4.8	-	-	-	A	4.8	-	-	-
Exchange EB L	C	33.7	0.25	20	46	C	34.2	0.28	23	51	C	34.2	0.28	23	51
Exchange EB T/R	B	13.2	0.26	2	30	B	12.8	0.28	2	31	B	12.8	0.28	2	31
Main NB T | T/R	A	2.7	0.21	24	33	A	2.9	0.22	25	35	A	2.9	0.22	26	37
Main SB L/T | T	A	2.5	0.17	18	32	A	2.5	0.18	19	35	A	2.6	0.18	20	35
Main St/Centre St	E	56.8	-	-	-	E	62.6	-	-	-	E	63.2	-	-	-
Centre EB L	D	43.2	0.66	51	84	D	45.1	0.68	53	#90	D	45.3	0.68	53	#94
Centre EB T | T/R	D	40.4	0.63	166	202	D	40.7	0.65	177	213	D	40.4	0.64	177	213
Centre WB L	F	187.4	1.30	~233	#418	F	218.6	1.38	~264	#461	F	214.8	1.37	~262	#459
Centre WB T | T/R	D	48.9	0.84	260	333	D	51.2	0.87	279	#358	D	52.8	0.89	291	#392
Main NB L	C	27.6	0.35	74	110	C	28.0	0.37	78	113	C	28.7	0.38	78	116
Main NB T	C	29.1	0.51	203	248	C	29.6	0.53	214	256	C	31.0	0.57	227	274
Main NB R	C	25.6	0.31	91	127	C	25.7	0.32	94	129	C	26.3	0.32	94	132
Main SB L	B	14.5	0.08	12	28	B	14.7	0.10	13	31	B	14.8	0.10	13	31
Main SB T	D	41.0	0.35	147	214	D	52.6	0.37	153	224	E	57.4	0.37	155	226
Main SB R	A	6.7	0.14	10	38	A	4.3	0.14	0	28	A	7.1	0.14	11	40

Intersection/ Movement	Existing (2020) Condition					No-Build (2027) Condition					Build (2027) Condition				
	LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length	
				50th (ft)	95th (ft)				50th (ft)	95th (ft)				50th (ft)	95th (ft)
Florence St/Washington St	C	34.2	-	-	-	D	36.7	-	-	-	D	37.6	-	-	-
Florence EB L/T | T/R	C	28.8	0.20	37	60	C	28.6	0.23	38	62	C	28.6	0.23	38	62
Florence WB L	C	27.0	0.02	3	12	C	27.0	0.02	3	12	C	27.0	0.02	3	12
Florence WB T | T/R	C	29.5	0.44	115	151	C	30.5	0.50	120	156	C	30.5	0.50	120	156
Washington NB L/T	D	53.1	0.57	66	93	E	59.8	0.67	70	#104	E	64.9	0.73	76	#116
Washington NB R	A	0.9	0.12	0	0	A	1.1	0.13	0	0	A	1.1	0.13	0	0
Washington SB L/T/R	D	41.0	0.78	108	#240	D	45.5	0.83	114	#253	D	45.5	0.83	114	#253
Unsignalized Intersections															
Pleasant St/Dartmouth St/ Middlesex St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pleasant WB T/R	A	0.0	0.18	-	0	A	0.0	0.19	-	0	A	0.0	0.22	-	0
Middlesex NB L/T	B	12.1	0.12	-	11	B	12.3	0.13	-	11	B	14.4	0.28	-	28
Florence St/Ramsdell Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Florence EB L/T	A	2.3	0.02	-	1	A	2.4	0.02	-	2	A	2.4	0.02	-	2
Florence EB T	A	0.0	0.06	-	0	A	0.0	0.07	-	0	A	0.0	0.07	-	0
Florence WB T	A	0.0	0.17	-	0	A	0.0	0.18	-	0	A	0.0	0.18	-	0
Florence WB T/R	A	0.0	0.12	-	0	A	0.0	0.13	-	0	A	0.0	0.13	-	0
Ramsdell SB L	C	16.8	0.21	-	19	C	17.5	0.22	-	21	C	18.0	0.25	-	25
Ramsdell SB R	B	10.6	0.04	-	3	B	10.7	0.04	-	3	B	10.7	0.04	-	3
Dartmouth St/Ramsdell Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ramsdell WB L/R	A	9.3	0.06	-	5	A	9.3	0.06	-	5	A	9.4	0.06	-	5
Dartmouth NB T/R	A	0.0	0.04	-	0	A	0.0	0.05	-	0	A	0.0	0.06	-	0
Dartmouth SB L/T	A	4.1	0.05	-	4	A	4.1	0.05	-	4	A	4.2	0.05	-	4
Mountain Ave/Dartmouth St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mountain EB T/R	A	0.0	0.22	-	0	A	0.0	0.23	-	0	A	0.0	0.23	-	0
Mountain WB L/T	A	2.0	0.07	-	6	A	2.0	0.07	-	6	A	2.0	0.07	-	6
Dartmouth NB L/R	C	21.1	0.35	-	38	C	22.5	0.38	-	42	C	22.5	0.38	-	43
Dartmouth St/Site Drive	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Driveway WB R	-	-	-	-	-	-	-	-	-	-	A	9.2	0.03	-	2
Dartmouth NB T/R	-	-	-	-	-	-	-	-	-	-	A	0.0	0.13	-	0

~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
 # 95th percentile queues do not clear after two cycles. Actual queues may be longer.
Grey shading indicates LOS E or F under the Existing (2020) Condition, or that LOS worsens to LOS E or F in the No-Build (2027) Condition or Build (2027) Condition.

Table 8. Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection/ Movement	Existing (2020) Condition					No-Build (2027) Condition					Build (2027) Condition				
	LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length	
				50th (ft)	95th (ft)				50th (ft)	95th (ft)				50th (ft)	95th (ft)
Signalized Intersections															
Main St/Florence St	D	35.6	-	-	-	D	44.6	-	-	-	D	44.6	-	-	-
Florence EB L	D	35.9	0.49	54	133	D	36.1	0.50	56	137	D	36.1	0.50	56	137
Florence EB R	A	9.6	0.57	0	55	A	9.5	0.57	0	55	A	9.8	0.63	0	58
Main NB L/T	D	38.9	0.90	138	#590	E	58.3	0.99	171	#656	E	60.7	1.00	174	#661
Main SB T/R	D	45.7	0.88	184	#485	D	50.7	0.92	196	#516	D	51.8	0.92	198	#521
Main St/Ferry St/Salem St	D	42.6	-	-	-	D	45.4	-	-	-	D	47.3	-	-	-
Main EB L	F	137.9	1.09	~123	#272	F	157.2	1.14	~142	#281	F	173.0	1.19	~145	#281
Main EB T/R	B	17.3	0.36	127	216	B	19.3	0.38	149	224	C	25.4	0.40	153	224
Salem WB L	C	20.9	0.19	25	59	C	21.7	0.20	28	61	C	22.2	0.21	28	61
Salem WB T/R	C	25.4	0.54	158	271	C	27.6	0.59	188	294	C	29.5	0.62	195	297
Ferry NB L/T	D	45.0	0.78	168	269	D	46.6	0.81	184	#299	D	42.8	0.77	186	#319
Ferry NB R	A	5.5	0.25	0	39	A	5.4	0.25	0	40	A	5.2	0.24	0	40
Main SB L/T	E	72.6	0.97	210	#370	E	73.5	0.97	222	#395	E	70.2	0.97	253	#445
Main SB R	B	16.2	0.25	71	116	B	16.0	0.25	75	122	B	15.9	0.26	82	131
Main St/Pleasant St	A	0.2	-	-	-	A	0.2	-	-	-	A	0.2	-	-	-
Main NB L/T | T	A	0.3	0.27	0	0	A	0.3	0.30	0	0	A	0.3	0.30	0	0
Main SB T | T/R	A	0.1	0.16	0	0	A	0.1	0.17	0	0	A	0.1	0.17	0	0
Main St/Exchange St/ Irving St	A	8.8	-	-	-	A	9.3	-	-	-	A	9.3	-	-	-
Exchange EB L	D	38.8	0.55	65	119	D	39.1	0.58	72	129	D	39.1	0.58	72	129
Exchange EB T/R	A	9.4	0.38	2	47	A	8.9	0.39	2	48	A	8.9	0.39	2	48
Main NB T | T/R	A	4.8	0.25	37	70	A	5.3	0.26	42	82	A	5.3	0.26	43	83
Main SB L/T | T	A	3.7	0.15	19	38	A	4.1	0.15	21	45	A	4.1	0.16	22	46
Main St/Centre St	D	39.9	-	-	-	D	42.7	-	-	-	D	43.7	-	-	-
Centre EB L	D	37.1	0.66	100	160	D	40.6	0.71	104	#176	D	41.2	0.72	104	#178
Centre EB T | T/R	D	50.5	0.86	271	345	D	52.7	0.88	288	#387	D	52.7	0.88	288	#387
Centre WB L	E	74.7	0.93	100	#242	F	85.5	0.98	104	#260	F	85.5	0.98	104	#260
Centre WB T | T/R	D	35.9	0.45	124	173	D	36.4	0.49	138	190	D	36.5	0.50	141	193
Main NB L	C	24.6	0.19	35	73	C	25.0	0.20	37	76	C	25.0	0.20	37	76
Main NB T	C	28.8	0.50	200	303	C	29.6	0.52	212	316	C	29.7	0.53	214	318
Main NB R	C	30.1	0.52	175	277	C	31.0	0.55	185	286	C	31.0	0.55	185	286
Main SB L	B	14.7	0.10	15	34	B	15.0	0.13	18	39	B	15.0	0.13	18	39
Main SB T	D	39.2	0.33	133	197	D	48.7	0.35	139	206	E	56.5	0.36	147	216
Main SB R	A	6.1	0.13	6	33	A	4.4	0.14	0	27	A	4.4	0.14	0	27

Intersection/ Movement	Existing (2020) Condition					No-Build (2027) Condition					Build (2027) Condition				
	LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length	
				50th (ft)	95th (ft)				50th (ft)	95th (ft)				50th (ft)	95th (ft)
Florence St/Washington St	C	27.4	-	-	-	C	28.0	-	-	-	C	29.0	-	-	-
Florence EB L/T | T/R	C	27.0	0.25	67	110	C	27.3	0.26	70	114	C	28.0	0.26	72	114
Florence WB L	C	26.0	0.00	0	4	C	26.0	0.00	0	4	C	26.0	0.00	0	4
Florence WB T | T/R	C	24.6	0.19	54	88	C	25.0	0.20	57	93	C	25.6	0.20	60	93
Washington NB L/T	D	39.5	0.36	46	89	D	39.8	0.38	50	95	D	41.1	0.46	70	124
Washington NB R	A	1.0	0.15	0	0	A	1.0	0.15	0	0	A	0.9	0.14	0	0
Washington SB L/T/R	C	34.9	0.51	43	#110	D	36.2	0.55	47	#122	D	35.5	0.52	48	#122
Unsignalized Intersections															
Pleasant St/Dartmouth St/ Middlesex St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pleasant WB T/R	A	0.0	0.15	-	0	A	0.0	0.17	-	0	A	0.0	0.18	-	0
Middlesex NB L/T	B	12.7	0.22	-	21	B	13.3	0.24	-	23	B	13.8	0.27	-	27
Florence St/Ramsdell Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Florence EB L/T	A	1.8	0.02	-	2	A	1.9	0.02	-	2	A	1.9	0.02	-	2
Florence EB T	A	0.0	0.11	-	0	A	0.0	0.11	-	0	A	0.0	0.11	-	0
Florence WB T	A	0.0	0.08	-	0	A	0.0	0.09	-	0	A	0.0	0.09	-	0
Florence WB T/R	A	0.0	0.08	-	0	A	0.0	0.08	-	0	A	0.0	0.08	-	0
Ramsdell SB L	B	14.7	0.24	-	23	C	15.1	0.25	-	25	C	17.0	0.37	-	43
Ramsdell SB R	A	9.7	0.05	-	4	A	9.7	0.06	-	4	A	9.7	0.06	-	4
Dartmouth St/Ramsdell Rd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ramsdell WB L/R	A	9.4	0.08	-	6	A	9.5	0.08	-	7	A	9.7	0.09	-	7
Dartmouth NB T/R	A	0.0	0.08	-	0	A	0.0	0.09	-	0	A	0.0	0.13	-	0
Dartmouth SB L/T	A	4.8	0.05	-	4	A	4.8	0.05	-	4	A	4.9	0.05	-	4
Mountain Ave/ Dartmouth St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mountain EB T/R	A	0.0	0.24	-	0	A	0.0	0.24	-	0	A	0.0	0.24	-	0
Mountain WB L/T	A	2.5	0.06	-	5	A	2.5	0.06	-	5	A	2.5	0.06	-	5
Dartmouth NB L/R	C	23.2	0.54	-	79	D	25.1	0.58	-	88	D	25.9	0.60	-	95
Dartmouth St/Site Drive	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Driveway WB R	-	-	-	-	-	-	-	-	-	-	A	9.7	0.13	-	11
Dartmouth NB T/R	-	-	-	-	-	-	-	-	-	-	A	0.0	0.11	-	0

~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
 # 95th percentile queues do not clear after two cycles. Actual queues may be longer.
Grey shading indicates LOS E or F under the Existing (2020) Condition, or that LOS worsens to LOS E or F in the No-Build (2027) Condition or Build (2027) Condition.

As shown in **Table 7** and **Table 8**, the studied signalized intersections generally have operations at acceptable levels (LOS D or better) under the Existing (2020) Condition, No-Build (2027) Condition, and Build (2027) Condition. Due to the level of new development planned within the area, most increased delays and queues are realized in the No-Build (2027) Condition. Under the Build (2027) Condition, the study area intersections and approaches will generally continue to operate at the same LOS as under the No-Build (2027) Condition with the following three exceptions.

- At the signalized intersection of Main Street/Ferry Street/Salem Street, the Salem Street westbound through/right lane decreases from LOS D to LOS E during the weekday a.m. peak hour under the Build (2020) Condition.
- At the signalized intersection of Main Street/Centre Street, the Main Street southbound through lane decreases from LOS D to LOS E during the weekday a.m. peak hour under the Build (2020) Condition.
- At the signalized intersection of Main Street/Centre Street, the Main Street southbound through lane decreases from LOS D to LOS E during the weekday p.m. peak hour under the Build (2020) Condition.

These impacts can be managed through traffic signal timing adjustments, described later in this report. The studied unsignalized intersections generally have acceptable operations under the Existing Condition, No-Build (2027) Condition, and Build (2027) Condition.

Transportation Demand Management and Mitigation

Transportation Demand Management

While the Project will not significantly impact traffic operations in the study area, the Proponent is committed to implementing a TDM program for Project residents in an effort to minimize the Project's vehicular impacts on the adjacent transportation network. The Project will be marketing to office tenants such as start-ups and other small office tenants and will be emphasizing the transit-oriented nature of the location to potential tenants. TDM measures will promote the use of public transportation (including the MBTA rapid transit, bus, and commuter rail), walking, and bicycling, and other options to reduce single occupant vehicle trips. TDM measures may include, but are not limited to, the following:

- ***Transportation Coordinator*** – The Project will designate a transportation coordinator to manage all transportation issues associated with the Project. The transportation coordinator will oversee transportation issues, including parking, service, loading, and move-in/move-out activity. The transportation coordinator will work with residents as they move in and to raise awareness of public transportation.
- ***Tenant Orientation Packets*** – These packets will provide all new tenants with information about available TDM programs and public transportation options (such as the MBTA rapid transit, bus, and commuter rail service in Malden, as well as the local car-sharing services) including program information, route schedules, maps, and fare information. While tenants may need to drive, bike, or be dropped off, to take advantage of some of these options, their use can reduce the overall impact on the local and regional transportation network.
- ***Bicycle Storage*** – The Proponent will provide 80 on-site secure bicycle storage spaces for Project tenant employees within the parking garage.
- ***Unbundled Parking*** – The Proponent will separate the rental of on-site parking spaces from tenant leases.
- ***Rideshare Information*** – The Proponent will provide information on area carpool and vanpool participants.
- ***Internal ride-matching*** – The Proponent will encourage tenants to organize an internal ride-matching program for employees who may be more willing to participate in carpooling and vanpooling with fellow employees than will participants in a large regional database.
- ***Guaranteed Ride Home*** – The Proponent will encourage employers to arrange to provide Guaranteed Ride Home when public transit service is not feasible or during hours which transit service is no longer available to an employee's home. Guaranteed Ride Home is designed to rescue commuters who are worried about how they'll get home when an emergency arises. It provides commuters who regularly (twice a week) carpool, vanpool, bike, walk or take transit to work with a free and reliable ride home. Commuters may take advantage of GRH up to four times per year to get home for unexpected emergencies, or for unscheduled overtime if the employer mandates that an employee must stay late.
- ***Transit Screen*** – The Proponent will provide a Transit Screen, which displays up-to-date arrival and departure information relating to different mobility options within the area.

Mitigation

While the associated traffic impacts related to the new Project trips are minimal, the Proponent is committed to implementing TDM measures and the improvements described in the following section. The mitigation measures will enhance both pedestrian and vehicular safety and flow:

- Provide new sidewalks along both sides of Dartmouth Street from Pleasant Street to Garnet Street and ADA-compliant pedestrian ramps at the corners of Dartmouth Street/Garnet Street;
- Bring the pedestrian accommodations at the intersection of Main Street/Florence Street into ADA compliance by installing pedestrian tactile warning panels at each crosswalk at the intersections of Main Street/Florence Street; and
- Restripe existing crosswalks with thermoplastic (ladder pattern) at the intersection of Pleasant Street/Dartmouth Street/Middlesex Street.

These improvements will be made by the Proponent during or after Project construction, as determined by City of Malden staff.

Additionally, the Project will impact the LOS of three movements at different intersections to LOS E. In accordance with City of Malden requirements, the Proponent must provide mitigation to address the degradation of LOS that were caused by the Project. In this case, the delay to the three movements were a few seconds longer than those in the No-Build (2027) Condition. The LOS were able improved to the No-Build (2027) Condition by making a few minor signal timing adjustments. The resulting capacity analysis summary is shown in **Table 9**. The City's peer reviewer requested that these changes not be made; therefore, the Proponent will not make any signal timing changes.

Table 9. Traffic Capacity Analysis, Mitigation Summary

Intersection/ Movement	Build (2027) Condition					Build-Mitigation (2027) Condition				
	LOS	Delay (s)	V/C ratio	%ile Queue Length		LOS	Delay (s)	V/C ratio	%ile Queue Length	
				50th (ft)	95th (ft)				50th (ft)	95th (ft)
Weekday a.m. Peak Hour										
Main St/Ferry St/Salem St	**D**	**49.0**	**-**	**-**	**-**	**D**	**50.8**	**-**	**-**	**-**
Main EB L	F	148.5	1.10	~114	#201	F	190.6	1.22	~124	#210
Main EB T/R	B	19.2	0.33	111	142	B	13.9	0.33	111	142
Salem WB L	C	24.7	0.32	43	86	C	23.8	0.31	43	84
Salem WB T/R	E	55.6	0.94	335	#542	D	50.7	0.92	329	#532
Ferry NB L/T	D	48.1	0.83	208	#314	D	48.1	0.83	208	#14
Ferry NB R	A	5.6	0.31	0	34	A	5.6	0.31	0	34
Main SB L/T	E	76.7	0.98	222	#364	E	76.7	0.98	222	#364
Main SB R	B	16.6	0.33	109	153	B	17.3	0.33	111	157
Main St/Centre St	**E**	**63.2**	**-**	**-**	**-**	**E**	**62.4**	**-**	**-**	**-**
Centre EB L	D	45.3	0.68	53	#94	D	45.3	0.68	53	#94
Centre EB T | T/R	D	40.4	0.64	177	213	D	40.4	0.64	177	213
Centre WB L	F	214.8	1.37	~262	#459	F	214.8	1.37	~262	#459
Centre WB T | T/R	D	52.8	0.89	291	#392	D	52.8	0.89	291	#392
Main NB L	C	28.7	0.38	78	116	C	27.7	0.37	76	113
Main NB T	C	31.0	0.57	227	274	C	29.9	0.55	223	269
Main NB R	C	26.3	0.32	94	132	C	25.5	0.32	93	129
Main SB L	B	14.8	0.10	13	31	B	14.2	0.09	13	30
Main SB T	E	57.4	0.37	155	226	D	52.9	0.37	152	221
Main SB R	A	7.1	0.14	11	40	A	6.8	0.14	10	39
Weekday p.m. Peak Hour										
Main St/Centre St	**D**	**43.7**	**-**	**-**	**-**	**D**	**42.8**	**-**	**-**	**-**
Centre EB L	D	41.2	0.72	104	#178	D	41.2	0.72	104	#178
Centre EB T | T/R	D	52.7	0.88	288	#387	D	52.7	0.88	288	#387
Centre WB L	F	85.5	0.98	104	#260	F	85.5	0.98	104	#260
Centre WB T | T/R	D	36.5	0.50	141	193	D	36.5	0.50	141	193
Main NB L	C	25.0	0.20	37	76	C	24.2	0.20	37	75
Main NB T	C	29.7	0.53	214	318	C	28.7	0.51	210	312
Main NB R	C	31.0	0.55	185	286	C	29.9	0.53	182	281
Main SB L	B	15.0	0.13	18	39	B	14.4	0.12	18	38
Main SB T	E	56.5	0.36	147	216	D	51.0	0.36	144	212
Main SB R	A	4.4	0.14	0	27	A	4.3	0.13	0	27

HOWARD STEIN HUDSON

Engineers + Planners

Appendix A

Count Data

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 1
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Florence Street
Count Date:	1/28/2020
Day of Week:	Tuesday
Weather:	Mostly Cloudy, 40°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
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www.BostonTrafficData.com

PASSENGER CARS & HEAVY VEHICLES COMBINED

	Main Street Northbound				Main Street Southbound				Florence Street Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	53	44	0	0	0	63	24	0	7	0	16	0	0	0	0
7:15 AM	0	61	45	0	0	0	76	22	0	9	0	30	0	0	0	0
7:30 AM	0	41	49	0	0	0	69	34	0	16	0	41	0	0	0	0
7:45 AM	0	67	59	0	0	0	60	47	0	19	0	41	0	0	0	0
8:00 AM	0	46	60	0	0	0	73	35	0	8	0	35	0	0	0	0
8:15 AM	0	63	62	0	0	0	66	23	0	15	0	34	0	0	0	0
8:30 AM	0	47	43	0	0	0	72	22	0	6	0	37	0	0	0	0
8:45 AM	0	56	49	0	0	0	66	24	0	7	0	32	0	0	0	0

	Main Street Northbound				Main Street Southbound				Florence Street Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	38	83	0	0	0	72	16	0	29	0	39	0	0	0	0
4:15 PM	0	42	67	0	0	0	53	14	0	23	0	43	0	0	0	0
4:30 PM	0	50	76	0	0	0	69	13	0	20	0	44	0	0	0	0
4:45 PM	0	43	79	0	0	0	66	11	0	23	0	52	0	0	0	0
5:00 PM	0	39	57	0	0	0	64	19	0	29	0	67	0	0	0	0
5:15 PM	0	60	61	0	0	0	71	19	0	37	0	52	0	0	0	0
5:30 PM	0	47	79	0	0	0	95	23	0	24	0	43	0	0	0	0
5:45 PM	0	44	50	0	0	0	54	17	0	33	0	47	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Main Street Northbound				Main Street Southbound				Florence Street Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**217**	**230**	**0**	**0**	**0**	**268**	**139**	**0**	**58**	**0**	**151**	**0**	**0**	**0**	**0**
PHF		**0.89**				**0.94**				**0.87**				**0.00**		
HV %	**0.0%**	**4.6%**	**5.2%**	**0.0%**	**0.0%**	**0.0%**	**4.5%**	**1.4%**	**0.0%**	**6.9%**	**0.0%**	**2.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Main Street Northbound				Main Street Southbound				Florence Street Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**189**	**276**	**0**	**0**	**0**	**296**	**72**	**0**	**113**	**0**	**214**	**0**	**0**	**0**	**0**
PHF		**0.92**				**0.78**				**0.85**				**0.00**		
HV %	**0.0%**	**5.3%**	**0.4%**	**0.0%**	**0.0%**	**0.0%**	**1.4%**	**2.8%**	**0.0%**	**0.9%**	**0.0%**	**0.5%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 1
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Florence Street
Count Date:	1/28/2020
Day of Week:	Tuesday
Weather:	Mostly Cloudy, 40°F

BOSTON TRAFFIC DATA
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HEAVY VEHICLES

	Main Street Northbound				Main Street Southbound				Florence Street Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	1	3	0	0	0	2	0	0	1	0	1	0	0	0	0
7:15 AM	0	5	3	0	0	0	6	0	0	0	0	0	0	0	0	0
7:30 AM	0	2	2	0	0	0	3	0	0	2	0	2	0	0	0	0
7:45 AM	0	5	4	0	0	0	2	1	0	1	0	1	0	0	0	0
8:00 AM	0	1	2	0	0	0	3	0	0	1	0	0	0	0	0	0
8:15 AM	0	2	4	0	0	0	4	1	0	0	0	1	0	0	0	0
8:30 AM	0	1	4	0	0	0	5	1	0	0	0	1	0	0	0	0
8:45 AM	0	3	3	0	0	0	3	2	0	1	0	2	0	0	0	0

	Main Street Northbound				Main Street Southbound				Florence Street Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	2	4	0	0	0	3	2	0	1	0	1	0	0	0	0
4:15 PM	0	0	3	0	0	0	1	1	0	0	0	2	0	0	0	0
4:30 PM	0	2	1	0	0	0	2	0	0	0	0	0	0	0	0	0
4:45 PM	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0
5:00 PM	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0
5:15 PM	0	5	1	0	0	0	1	0	0	1	0	0	0	0	0	0
5:30 PM	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0

AM PEAK HOUR 7:00 AM to 8:00 AM	Main Street Northbound				Main Street Southbound				Florence Street Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**13**	**12**	**0**	**0**	**0**	**13**	**1**	**0**	**4**	**0**	**4**	**0**	**0**	**0**	**0**
PHF	**0.69**				**0.58**				**0.50**				**0.00**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Main Street Northbound				Main Street Southbound				Florence Street Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**5**	**8**	**0**	**0**	**0**	**6**	**4**	**0**	**1**	**0**	**4**	**0**	**0**	**0**	**0**
PHF	**0.54**				**0.50**				**0.63**				**0.00**			

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 1
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Florence Street
Count Date:	1/28/2020
Day of Week:	Tuesday
Weather:	Mostly Cloudy, 40°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
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PEDESTRIANS & BICYCLES

	Main Street Northbound					Main Street Southbound					Florence Street Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	1		0	1	0	3		0	0	1	7		0	0	0	0	
7:15 AM	0	0	0	2		0	1	0	2		0	0	1	3		0	0	0	0	
7:30 AM	0	0	0	0		0	1	0	5		0	0	0	9		0	0	0	0	
7:45 AM	0	0	0	4		0	0	1	4		0	0	0	3		0	0	0	0	
8:00 AM	0	0	0	4		0	3	0	6		0	0	0	2		0	0	0	0	
8:15 AM	0	1	0	2		0	2	0	7		0	0	0	3		0	0	0	0	
8:30 AM	0	0	0	2		0	0	0	6		0	0	0	2		0	0	0	0	
8:45 AM	0	0	0	1		0	0	0	5		0	0	0	12		0	0	0	0	

	Main Street Northbound					Main Street Southbound					Florence Street Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	4		0	0	0	6		0	0	0	6		0	0	0	0	
4:15 PM	0	0	0	0		0	0	0	12		0	0	0	3		0	0	0	0	
4:30 PM	0	1	0	1		0	0	0	8		0	0	0	7		0	0	0	0	
4:45 PM	0	0	0	2		0	0	0	7		0	0	0	5		0	0	0	0	
5:00 PM	0	0	0	3		0	0	0	12		0	0	0	9		0	0	0	0	
5:15 PM	0	0	0	3		0	0	0	3		0	0	0	13		0	0	0	0	
5:30 PM	0	0	0	5		0	0	0	4		1	0	0	7		0	0	0	0	
5:45 PM	0	0	0	1		0	0	0	2		0	0	0	12		0	0	0	0	

AM PEAK HOUR[1]	Main Street Northbound					Main Street Southbound					Florence Street Eastbound					Westbound				
7:30 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:30 AM	0	1	0	10		0	6	1	22		0	0	0	17		0	0	0	0	

PM PEAK HOUR[1]	Main Street Northbound					Main Street Southbound					Florence Street Eastbound					Westbound				
4:45 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:45 PM	0	0	0	13		0	0	0	26		1	0	0	34		0	0	0	0	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 2
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Salem Street & Ferry Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

PASSENGER CARS & HEAVY VEHICLES COMBINED

	Main Street Northeastbound				Main Street Southeastbound				Ferry Street Northwestbound				Salem Street Southwestbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	19	29	3	0	8	40	32	0	4	27	6	0	11	55	37
7:15 AM	0	26	46	7	0	15	48	46	0	7	39	16	0	14	50	48
7:30 AM	0	28	64	7	0	38	33	38	0	18	56	33	0	27	74	44
7:45 AM	0	31	73	7	0	27	48	66	1	16	56	43	0	22	57	46
8:00 AM	0	27	31	2	0	18	36	60	0	9	68	25	0	17	73	42
8:15 AM	0	29	25	5	0	10	41	52	0	10	43	14	0	11	80	27
8:30 AM	0	25	27	3	0	10	48	50	0	7	42	11	0	4	61	28
8:45 AM	0	20	40	6	0	15	38	51	0	13	40	14	0	9	52	41

	Main Street Northeastbound				Main Street Southeastbound				Ferry Street Northwestbound				Salem Street Southwestbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	1	38	77	6	0	16	59	50	0	11	52	28	0	15	53	25
4:15 PM	1	37	71	6	0	14	60	44	0	5	45	22	0	16	58	21
4:30 PM	2	37	77	6	0	24	50	50	0	9	53	26	0	8	47	27
4:45 PM	1	43	85	3	0	25	64	43	0	12	51	27	0	14	52	26
5:00 PM	2	41	91	4	0	15	54	49	0	8	63	33	0	13	57	29
5:15 PM	1	39	92	9	0	23	58	45	0	7	66	25	0	18	41	27
5:30 PM	1	36	84	6	0	23	55	42	0	6	53	29	0	12	53	20
5:45 PM	1	37	81	6	0	27	61	47	0	4	55	18	0	11	48	23

AM PEAK HOUR 7:15 AM to 8:15 AM	Main Street Northeastbound				Main Street Southeastbound				Ferry Street Northwestbound				Salem Street Southwestbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**112**	**214**	**23**	**0**	**98**	**165**	**210**	**1**	**50**	**219**	**117**	**0**	**80**	**254**	**180**
PHF	**0.79**				**0.84**				**0.83**				**0.89**			
HV %	**0.0%**	**13.4%**	**7.5%**	**17.4%**	**0.0%**	**4.1%**	**2.4%**	**1.4%**	**0.0%**	**2.0%**	**1.4%**	**0.9%**	**0.0%**	**1.3%**	**4.7%**	**1.1%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Main Street Northeastbound				Main Street Southeastbound				Ferry Street Northwestbound				Salem Street Southwestbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	5	**159**	**352**	**22**	**0**	**86**	**231**	**179**	**0**	**33**	**233**	**114**	**0**	**57**	**203**	**102**
PHF	**0.95**				**0.94**				**0.91**				**0.91**			
HV %	**0.0%**	**5.0%**	**3.7%**	**18.2%**	**0.0%**	**0.0%**	**1.3%**	**3.4%**	**0.0%**	**3.0%**	**3.4%**	**0.9%**	**0.0%**	**3.5%**	**4.9%**	**0.0%**

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 2
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Salem Street & Ferry Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

HEAVY VEHICLES

	Main Street Northeastbound				Main Street Southeastbound				Ferry Street Northwestbound				Salem Street Southwestbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	3	4	0	0	0	0	5	0	0	0	0	0	0	2	1
7:15 AM	0	6	3	1	0	0	2	0	0	0	0	0	0	0	4	1
7:30 AM	0	3	4	1	0	0	1	1	0	1	0	1	0	0	1	0
7:45 AM	0	2	6	1	0	2	0	2	0	0	1	0	0	1	3	1
8:00 AM	0	4	3	1	0	2	1	0	0	0	2	0	0	0	4	0
8:15 AM	0	5	2	1	0	0	0	4	0	0	0	1	0	0	3	0
8:30 AM	0	3	3	1	0	0	0	3	0	0	0	2	0	0	4	1
8:45 AM	0	5	4	1	0	0	1	2	0	0	1	1	0	1	5	1

	Main Street Northeastbound				Main Street Southeastbound				Ferry Street Northwestbound				Salem Street Southwestbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	4	4	1	0	0	2	1	0	2	0	0	0	0	2	0
4:15 PM	0	0	1	1	0	0	0	2	0	0	2	0	0	0	6	1
4:30 PM	0	3	4	1	0	1	1	2	0	0	0	0	0	0	0	1
4:45 PM	0	3	5	1	0	0	0	0	0	0	0	1	0	0	2	0
5:00 PM	0	1	2	1	0	0	2	2	0	1	2	0	0	2	1	0
5:15 PM	0	3	3	0	0	0	0	4	0	0	1	0	0	0	3	0
5:30 PM	0	1	3	2	0	0	1	0	0	0	5	0	0	0	4	0
5:45 PM	0	3	2	1	0	2	1	1	0	0	0	0	0	0	2	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Main Street Northeastbound				Main Street Southeastbound				Ferry Street Northwestbound				Salem Street Southwestbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**17**	**12**	**4**	**0**	**2**	**2**	**9**	**0**	**0**	**3**	**4**	**0**	**1**	**16**	**2**
PHF	**0.83**				**0.81**				**0.88**				**0.68**			

PM PEAK HOUR 4:45 PM to 5:45 PM	Main Street Northeastbound				Main Street Southeastbound				Ferry Street Northwestbound				Salem Street Southwestbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**8**	**13**	**4**	**0**	**0**	**3**	**6**	**0**	**1**	**8**	**1**	**0**	**2**	**10**	**0**
PHF	**0.69**				**0.56**				**0.50**				**0.75**			

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 2
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Salem Street & Ferry Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

PEDESTRIANS & BICYCLES

	Main Street Northeastbound					Main Street Southeastbound					Ferry Street Northwestbound					Salem Street Southwestbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	8		0	0	1	13		0	0	0	4		0	0	0	10	
7:15 AM	0	0	0	12		0	0	0	19		0	0	0	31		0	0	0	21	
7:30 AM	1	0	0	6		0	0	0	39		0	0	0	69		0	1	0	46	
7:45 AM	0	0	0	11		0	0	0	36		0	0	0	75		0	0	0	44	
8:00 AM	0	0	0	4		0	1	2	14		0	0	0	16		0	0	0	7	
8:15 AM	0	0	0	3		0	0	0	28		0	0	0	8		0	1	0	7	
8:30 AM	0	0	0	6		0	0	0	37		0	0	0	2		0	0	0	10	
8:45 AM	0	0	0	38		0	0	0	36		0	0	0	12		0	1	0	9	

	Main Street Northeastbound					Main Street Southeastbound					Ferry Street Northwestbound					Salem Street Southwestbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	4		0	0	1	21		0	0	0	18		0	0	0	8	
4:15 PM	0	0	0	5		0	0	0	13		0	0	0	9		0	0	0	12	
4:30 PM	0	0	0	8		0	0	0	16		0	0	0	15		0	0	0	5	
4:45 PM	1	0	0	11		0	0	1	20		0	0	0	9		0	0	0	3	
5:00 PM	1	0	0	4		0	0	0	11		0	0	0	9		0	1	0	1	
5:15 PM	1	0	0	3		0	0	0	26		0	0	0	16		0	0	0	3	
5:30 PM	0	0	0	2		0	0	0	24		0	0	0	24		0	0	0	1	
5:45 PM	1	0	0	11		0	0	0	25		0	0	0	15		0	0	0	4	

AM PEAK HOUR[1]	Main Street Northeastbound					Main Street Southeastbound					Ferry Street Northwestbound					Salem Street Southwestbound				
7:15 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:15 AM	1	0	0	33		0	1	2	108		0	0	0	191		0	1	0	118	

PM PEAK HOUR[1]	Main Street Northeastbound					Main Street Southeastbound					Ferry Street Northwestbound					Salem Street Southwestbound				
4:45 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:45 PM	3	0	0	20		0	0	1	81		0	0	0	58		0	1	0	8	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 3
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Pleasant Street & Driveway
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

BOSTON TRAFFIC DATA
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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Main Street Northbound				Main Street Southbound				Pleasant Street Eastbound				Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	7	51	0	0	0	79	12	0	0	0	0	0	0	0	0
7:15 AM	0	9	76	0	3	0	74	26	0	0	0	0	0	0	0	0
7:30 AM	0	12	98	2	1	0	104	25	0	0	0	0	0	0	0	0
7:45 AM	0	21	108	2	3	2	102	32	0	0	0	0	0	0	0	0
8:00 AM	0	26	60	0	0	0	104	38	0	0	0	0	0	0	0	0
8:15 AM	0	29	59	4	0	1	95	46	0	0	0	0	0	0	0	0
8:30 AM	0	25	52	1	3	1	88	26	0	0	0	0	0	0	0	0
8:45 AM	0	14	65	2	1	1	92	22	0	0	0	0	0	0	0	0

	Main Street Northbound				Main Street Southbound				Pleasant Street Eastbound				Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	31	121	0	1	0	80	34	0	0	0	0	0	0	0	0
4:15 PM	0	29	113	0	2	1	82	23	0	0	0	0	0	0	0	0
4:30 PM	0	22	119	0	3	0	79	26	0	0	0	0	0	0	0	0
4:45 PM	1	24	130	0	2	0	70	36	0	0	0	0	0	0	0	0
5:00 PM	0	29	132	1	5	0	82	29	0	0	0	0	0	0	0	1
5:15 PM	0	30	139	0	1	0	72	21	0	0	0	0	0	1	1	1
5:30 PM	0	31	126	0	1	0	77	24	0	0	0	0	0	0	0	0
5:45 PM	0	26	124	0	1	0	73	26	0	0	0	0	0	1	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Main Street Northbound				Main Street Southbound				Pleasant Street Eastbound				Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**88**	**325**	**8**	**4**	**3**	**405**	**141**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF		**0.80**				**0.97**				**0.00**				**0.00**		
HV %	**0.0%**	**2.3%**	**10.5%**	**0.0%**	**0.0%**	**0.0%**	**4.0%**	**1.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Main Street Northbound				Main Street Southbound				Pleasant Street Eastbound				Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**114**	**527**	**1**	**9**	**0**	**301**	**110**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**2**
PHF		**0.95**				**0.91**				**0.00**				**0.33**		
HV %	**0.0%**	**1.8%**	**4.7%**	**0.0%**	**0.0%**	**0.0%**	**4.7%**	**1.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 3
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Pleasant Street & Driveway
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

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HEAVY VEHICLES

	Main Street Northbound				Main Street Southbound				Pleasant Street Eastbound				Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	8	0	0	0	5	1	0	0	0	0	0	0	0	0
7:15 AM	0	1	9	0	0	0	4	0	0	0	0	0	0	0	0	0
7:30 AM	0	2	7	0	0	0	2	1	0	0	0	0	0	0	0	0
7:45 AM	0	0	10	0	0	0	5	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	9	0	0	0	3	1	0	0	0	0	0	0	0	0
8:15 AM	0	0	8	0	0	0	6	0	0	0	0	0	0	0	0	0
8:30 AM	0	1	6	0	0	0	6	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	11	0	0	0	7	1	0	0	0	0	0	0	0	0

	Main Street Northbound				Main Street Southbound				Pleasant Street Eastbound				Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	1	8	0	0	0	3	1	0	0	0	0	0	0	0	0
4:15 PM	0	0	3	0	0	0	9	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	7	0	0	0	2	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	8	0	0	0	3	0	0	0	0	0	0	0	0	0
5:00 PM	0	2	5	0	0	0	2	1	0	0	0	0	0	0	0	0
5:15 PM	0	0	6	0	0	0	6	1	0	0	0	0	0	0	0	0
5:30 PM	0	0	6	0	0	0	3	0	0	0	0	0	0	0	0	0
5:45 PM	0	2	5	0	0	0	3	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Main Street Northbound				Main Street Southbound				Pleasant Street Eastbound				Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**34**	**0**	**0**	**0**	**22**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.80**				**0.75**				**0.00**				**0.00**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Main Street Northbound				Main Street Southbound				Pleasant Street Eastbound				Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**26**	**0**	**0**	**0**	**17**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.75**				**0.50**				**0.00**				**0.00**			

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 3
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Pleasant Street & Driveway
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

BOSTON TRAFFIC DATA
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PEDESTRIANS & BICYCLES

	Main Street Northbound					Main Street Southbound					Pleasant Street Eastbound					Driveway Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	3		0	0	1	3		0	0	0	3		0	0	0	1	
7:15 AM	0	0	0	4		0	0	0	12		0	0	0	5		0	0	0	17	
7:30 AM	0	0	0	5		0	1	0	26		0	0	0	10		0	0	0	20	
7:45 AM	0	0	0	4		0	0	0	28		0	0	0	11		0	0	0	24	
8:00 AM	0	0	0	5		0	2	0	10		0	0	0	8		0	0	0	13	
8:15 AM	0	0	0	5		0	0	1	13		0	0	0	7		0	0	0	4	
8:30 AM	0	0	0	2		0	0	0	7		0	0	0	10		0	0	0	16	
8:45 AM	0	0	0	7		0	0	1	10		0	0	0	12		0	0	0	20	

	Main Street Northbound					Main Street Southbound					Pleasant Street Eastbound					Driveway Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	17		0	0	1	20		0	0	0	6		0	0	0	16	
4:15 PM	0	1	0	9		0	0	0	11		0	0	0	12		0	0	0	19	
4:30 PM	0	0	0	6		0	0	0	13		0	0	0	15		0	0	0	16	
4:45 PM	0	0	0	8		0	0	1	12		0	0	0	14		0	0	0	11	
5:00 PM	0	1	0	9		0	1	0	20		0	0	0	10		0	0	0	6	
5:15 PM	0	1	0	7		0	0	0	13		0	0	0	8		0	0	0	5	
5:30 PM	0	0	0	3		0	0	0	15		0	0	0	14		0	0	0	4	
5:45 PM	1	1	0	16		0	0	0	16		0	0	0	10		0	0	0	4	

AM PEAK HOUR[1]	Main Street Northbound					Main Street Southbound					Pleasant Street Eastbound					Driveway Westbound				
7:30 AM to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:30 AM	0	0	0	19		0	3	1	77		0	0	0	36		0	0	0	61	

PM PEAK HOUR[1]	Main Street Northbound					Main Street Southbound					Pleasant Street Eastbound					Driveway Westbound				
4:45 PM to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:45 PM	0	2	0	27		0	1	1	60		0	0	0	46		0	0	0	26	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 4
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Exchange Street & Irving Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Main Street Northbound				Main Street Southbound				Exchange Street Eastbound				Irving Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	53	0	0	0	79	0	0	5	0	6	0	0	0	0
7:15 AM	0	0	79	0	0	1	73	0	0	6	1	9	0	0	0	0
7:30 AM	0	0	100	3	0	0	104	0	0	12	1	10	0	0	0	0
7:45 AM	0	0	119	14	0	6	96	0	0	12	0	14	0	0	0	0
8:00 AM	0	0	80	4	0	4	100	0	0	6	1	8	0	0	0	0
8:15 AM	0	0	85	1	0	1	94	0	0	7	2	13	0	0	0	0
8:30 AM	1	0	69	2	0	4	84	0	0	9	0	17	0	0	0	0
8:45 AM	0	0	74	5	0	2	90	0	0	7	0	16	0	0	0	0

	Main Street Northbound				Main Street Southbound				Exchange Street Eastbound				Irving Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	118	4	0	2	78	0	0	34	1	23	0	0	0	0
4:15 PM	0	0	116	3	0	0	82	0	0	26	1	28	0	0	0	0
4:30 PM	0	0	129	4	0	2	77	0	0	12	1	27	0	0	0	0
4:45 PM	0	0	125	4	0	2	69	0	0	30	2	19	0	0	0	0
5:00 PM	0	0	143	6	0	2	80	0	0	19	0	28	0	0	0	0
5:15 PM	0	0	133	4	0	2	71	0	0	36	3	25	0	0	0	0
5:30 PM	0	0	126	5	0	0	77	0	0	31	1	34	0	0	0	0
5:45 PM	0	0	115	3	0	1	73	0	0	35	0	26	0	0	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Main Street Northbound				Main Street Southbound				Exchange Street Eastbound				Irving Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**384**	**22**	**0**	**11**	**394**	**0**	**0**	**37**	**4**	**45**	**0**	**0**	**0**	**0**
PHF			**0.76**				**0.97**				**0.83**				**0.00**	
HV %	**0.0%**	**0.0%**	**9.4%**	**0.0%**	**0.0%**	**0.0%**	**4.1%**	**0.0%**	**0.0%**	**2.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 5:00 PM to 6:00 PM	Main Street Northbound				Main Street Southbound				Exchange Street Eastbound				Irving Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**517**	**18**	**0**	**5**	**301**	**0**	**0**	**121**	**4**	**113**	**0**	**0**	**0**	**0**
PHF			**0.90**				**0.93**				**0.90**				**0.00**	
HV %	**0.0%**	**0.0%**	**5.0%**	**0.0%**	**0.0%**	**0.0%**	**4.3%**	**0.0%**	**0.0%**	**0.0%**	**25.0%**	**1.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 4
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Exchange Street & Irving Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

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HEAVY VEHICLES

	Main Street Northbound				Main Street Southbound				Exchange Street Eastbound				Irving Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	8	0	0	0	5	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	10	0	0	0	4	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	9	0	0	0	2	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	11	0	0	0	5	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	9	0	0	0	4	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	7	0	0	0	5	0	0	1	0	0	0	0	0	0
8:30 AM	0	0	6	0	0	0	5	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	12	0	0	0	7	0	0	0	0	1	0	0	0	0

	Main Street Northbound				Main Street Southbound				Exchange Street Eastbound				Irving Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	8	1	0	0	3	0	0	2	0	0	0	0	0	0
4:15 PM	0	0	3	0	0	0	9	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	7	0	0	0	1	0	0	0	0	2	0	0	0	0
4:45 PM	0	0	8	0	0	0	2	0	0	0	0	1	0	0	0	0
5:00 PM	0	0	6	0	0	0	2	0	0	0	0	1	0	0	0	0
5:15 PM	0	0	6	0	0	0	6	0	0	0	1	0	0	0	0	0
5:30 PM	0	0	6	0	0	0	3	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	8	0	0	0	2	0	0	0	0	1	0	0	0	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Main Street Northbound				Main Street Southbound				Exchange Street Eastbound				Irving Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**34**	**0**	**0**	**0**	**21**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**
PHF	**0.71**				**0.75**				**0.50**				**0.00**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Main Street Northbound				Main Street Southbound				Exchange Street Eastbound				Irving Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**26**	**1**	**0**	**0**	**15**	**0**	**0**	**2**	**0**	**3**	**0**	**0**	**0**	**0**
PHF	**0.75**				**0.42**				**0.63**				**0.00**			

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 4
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Exchange Street & Irving Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

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PEDESTRIANS & BICYCLES

	Main Street Northbound					Main Street Southbound					Exchange Street Eastbound					Irving Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	3		0	0	0	3		0	0	0	5		0	0	0	1	
7:15 AM	0	0	0	8		0	0	0	4		0	0	0	6		0	0	0	8	
7:30 AM	0	0	0	8		0	0	0	9		0	0	0	14		0	0	0	13	
7:45 AM	0	0	0	9		0	1	0	5		0	0	0	12		0	0	0	5	
8:00 AM	0	0	0	17		0	1	0	7		0	0	0	10		0	0	0	4	
8:15 AM	0	0	0	17		0	0	0	5		0	0	0	6		0	0	0	2	
8:30 AM	0	0	0	10		0	0	0	11		0	0	0	13		0	0	0	11	
8:45 AM	0	0	0	11		0	0	0	12		0	0	0	16		0	0	0	6	

	Main Street Northbound					Main Street Southbound					Exchange Street Eastbound					Irving Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	5		0	0	0	13		0	0	0	8		0	0	0	15	
4:15 PM	0	1	0	3		0	0	0	9		0	0	0	15		0	0	0	10	
4:30 PM	0	0	0	7		0	0	0	18		0	0	0	18		0	0	0	7	
4:45 PM	0	1	0	8		0	0	0	6		0	0	0	16		0	0	0	7	
5:00 PM	0	1	0	12		0	1	0	6		0	0	0	12		0	0	0	9	
5:15 PM	0	1	0	8		0	0	0	4		0	0	0	11		0	0	0	9	
5:30 PM	0	0	0	12		0	0	0	12		0	0	0	17		0	0	0	5	
5:45 PM	0	1	0	13		0	0	0	9		0	0	0	12		0	0	0	6	

AM PEAK HOUR[1] 7:30 AM to 8:30 AM	Main Street Northbound					Main Street Southbound					Exchange Street Eastbound					Irving Street Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	0	51		0	2	0	26		0	0	0	42		0	0	0	24	

PM PEAK HOUR[1] 5:00 PM to 6:00 PM	Main Street Northbound					Main Street Southbound					Exchange Street Eastbound					Irving Street Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	3	0	45		0	1	0	31		0	0	0	52		0	0	0	29	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 5
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Centre Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Main Street Northbound				Main Street Southbound				Centre Street Eastbound				Centre Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	20	29	25	0	4	69	12	0	18	83	11	0	54	146	6
7:15 AM	0	21	53	33	0	2	53	27	0	23	89	12	0	81	127	3
7:30 AM	0	18	67	45	0	10	79	25	0	27	102	15	0	69	145	9
7:45 AM	0	39	99	27	0	12	80	18	0	16	89	9	0	72	147	18
8:00 AM	0	26	47	26	0	4	83	21	0	18	69	11	0	88	152	19
8:15 AM	0	17	48	14	0	8	77	22	0	25	65	10	0	92	116	13
8:30 AM	0	11	37	18	0	8	69	25	0	28	76	11	1	70	129	7
8:45 AM	0	16	41	19	0	12	66	28	0	32	70	9	0	65	86	6

	Main Street Northbound				Main Street Southbound				Centre Street Eastbound				Centre Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	13	70	60	0	14	70	17	0	41	138	9	0	52	95	11
4:15 PM	0	12	65	60	0	11	71	28	0	42	129	19	0	36	77	12
4:30 PM	0	17	79	83	0	11	78	15	0	43	154	13	0	41	90	11
4:45 PM	0	13	70	68	0	9	59	20	0	42	167	16	0	42	59	17
5:00 PM	0	18	89	71	0	6	75	27	0	50	148	12	0	45	78	10
5:15 PM	0	17	85	57	0	12	63	21	0	45	158	12	0	50	85	7
5:30 PM	0	18	78	50	0	19	74	18	0	36	157	19	0	47	69	17
5:45 PM	0	15	71	58	0	20	64	15	0	38	146	12	0	32	64	9

AM PEAK HOUR 7:15 AM to 8:15 AM	Main Street Northbound				Main Street Southbound				Centre Street Eastbound				Centre Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**104**	**266**	**131**	**0**	**28**	**295**	**91**	**0**	**84**	**349**	**47**	**0**	**310**	**571**	**49**
PHF		**0.76**				**0.91**				**0.83**				**0.90**		
HV %	**0.0%**	**1.9%**	**5.6%**	**5.3%**	**0.0%**	**3.6%**	**1.7%**	**9.9%**	**0.0%**	**26.2%**	**7.4%**	**14.9%**	**0.0%**	**2.6%**	**1.6%**	**4.1%**

PM PEAK HOUR 4:30 PM to 5:30 PM	Main Street Northbound				Main Street Southbound				Centre Street Eastbound				Centre Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**65**	**323**	**279**	**0**	**38**	**275**	**83**	**0**	**180**	**627**	**53**	**0**	**178**	**312**	**45**
PHF		**0.93**				**0.92**				**0.96**				**0.94**		
HV %	**0.0%**	**4.6%**	**3.4%**	**2.9%**	**0.0%**	**0.0%**	**2.5%**	**10.8%**	**0.0%**	**8.3%**	**0.6%**	**13.2%**	**0.0%**	**1.7%**	**1.9%**	**0.0%**

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 5
Location:	Malden, MA
Street 1:	Main Street
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Count Date:	1/23/2020
Day of Week:	Thursday
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HEAVY VEHICLES

	Main Street Northbound				Main Street Southbound				Centre Street Eastbound				Centre Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	2	3	0	0	4	0	0	5	8	1	0	0	3	0
7:15 AM	0	0	6	1	0	0	1	3	0	4	3	1	0	1	4	0
7:30 AM	0	1	3	3	0	1	0	1	0	5	10	3	0	5	2	1
7:45 AM	0	0	3	1	0	0	1	4	0	7	5	1	0	2	0	1
8:00 AM	0	1	3	2	0	0	3	1	0	6	8	2	0	0	3	0
8:15 AM	0	0	3	2	0	0	4	1	0	4	2	0	0	1	2	0
8:30 AM	0	1	3	1	0	1	3	0	0	3	3	5	0	1	5	0
8:45 AM	0	1	6	2	0	1	4	3	0	6	5	1	0	3	2	0

	Main Street Northbound				Main Street Southbound				Centre Street Eastbound				Centre Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	1	4	0	0	0	1	2	0	4	1	0	0	2	2	1
4:15 PM	0	1	1	0	0	0	2	7	0	2	2	1	0	0	0	0
4:30 PM	0	1	2	3	0	0	2	1	0	5	1	3	0	2	3	0
4:45 PM	0	0	2	4	0	0	1	2	0	5	1	1	0	0	0	0
5:00 PM	0	1	4	1	0	0	2	2	0	2	2	3	0	0	1	0
5:15 PM	0	1	3	0	0	0	2	4	0	3	0	0	0	1	2	0
5:30 PM	0	0	3	2	0	0	1	2	0	3	1	1	0	0	1	0
5:45 PM	0	1	3	0	0	0	1	1	0	5	0	2	0	0	0	0

AM PEAK HOUR 7:15 AM to 8:15 AM	Main Street Northbound				Main Street Southbound				Centre Street Eastbound				Centre Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**2**	**15**	**7**	**0**	**1**	**5**	**9**	**0**	**22**	**26**	**7**	**0**	**8**	**9**	**2**
PHF	**0.86**				**0.75**				**0.76**				**0.59**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Main Street Northbound				Main Street Southbound				Centre Street Eastbound				Centre Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**3**	**9**	**7**	**0**	**0**	**6**	**12**	**0**	**16**	**5**	**5**	**0**	**4**	**5**	**1**
PHF	**0.79**				**0.50**				**0.72**				**0.50**			

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 5
Location:	Malden, MA
Street 1:	Main Street
Street 2:	Centre Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
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PEDESTRIANS & BICYCLES

	Main Street Northbound					Main Street Southbound					Centre Street Eastbound					Centre Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	6		0	0	0	4		0	0	0	5		0	0	0	1	
7:15 AM	0	0	0	2		0	0	0	2		0	0	0	4		0	0	0	2	
7:30 AM	0	0	0	5		0	1	0	5		0	0	0	10		0	1	0	13	
7:45 AM	0	0	0	3		0	0	0	3		0	0	0	6		0	0	0	11	
8:00 AM	0	0	0	3		0	2	0	2		0	0	0	7		0	0	0	4	
8:15 AM	0	0	0	4		0	0	0	3		0	1	0	6		0	2	0	5	
8:30 AM	0	0	0	3		0	0	0	1		0	0	0	7		0	0	0	7	
8:45 AM	0	0	0	4		0	0	0	2		0	0	0	14		0	0	0	5	

	Main Street Northbound					Main Street Southbound					Centre Street Eastbound					Centre Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	11		0	0	0	3		0	0	0	7		0	0	0	6	
4:15 PM	0	0	0	12		0	0	0	1		1	0	0	17		0	0	0	4	
4:30 PM	0	0	0	10		0	0	0	5		0	0	0	18		0	0	0	8	
4:45 PM	0	1	0	12		0	0	0	2		0	0	0	19		0	0	0	4	
5:00 PM	0	0	0	7		0	1	0	1		0	0	0	7		0	0	0	6	
5:15 PM	0	1	0	8		0	0	0	3		0	1	0	10		0	0	0	1	
5:30 PM	0	0	0	11		0	0	0	3		0	1	0	12		0	0	0	2	
5:45 PM	0	0	0	5		0	0	0	3		0	0	0	20		0	0	1	4	

AM PEAK HOUR[1]	Main Street Northbound					Main Street Southbound					Centre Street Eastbound					Centre Street Westbound				
7:15 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:15 AM	0	0	0	13		0	3	0	12		0	0	0	27		0	1	0	30	

PM PEAK HOUR[1]	Main Street Northbound					Main Street Southbound					Centre Street Eastbound					Centre Street Westbound				
4:30 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:30 PM	0	2	0	37		0	1	0	11		0	1	0	54		0	0	0	19	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 6
Location:	Malden, MA
Street 1:	Pleasant Street
Street 2:	Middlesex Street & Dartmouth Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Middlesex Street Northbound				Dartmouth Street Southbound				Pleasant Street Eastbound				Pleasant Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	3	2	0	0	0	0	0	0	0	0	0	0	0	16	3
7:15 AM	0	8	5	0	0	0	0	0	0	0	0	0	0	0	26	10
7:30 AM	0	4	9	0	0	0	0	0	0	0	0	0	0	0	29	10
7:45 AM	0	8	9	0	0	0	0	0	0	0	0	0	0	0	32	19
8:00 AM	0	5	6	0	0	0	0	0	0	0	0	0	0	0	39	24
8:15 AM	0	7	10	0	0	0	0	0	0	0	0	0	0	0	55	17
8:30 AM	0	2	7	0	0	0	0	0	0	0	0	0	0	0	36	14
8:45 AM	0	12	7	0	0	0	0	0	0	0	0	0	0	0	22	13

	Middlesex Street Northbound				Dartmouth Street Southbound				Pleasant Street Eastbound				Pleasant Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	11	20	0	0	0	0	0	0	0	0	0	0	0	43	18
4:15 PM	0	11	9	0	0	0	0	0	0	0	0	0	0	0	41	13
4:30 PM	0	15	13	0	0	0	0	0	0	0	0	0	0	0	33	15
4:45 PM	0	15	14	0	0	0	0	0	0	0	0	0	0	0	30	30
5:00 PM	0	9	13	0	0	0	0	0	0	0	0	0	0	0	38	21
5:15 PM	0	17	12	0	0	0	0	0	0	0	0	0	0	0	36	18
5:30 PM	0	13	5	0	0	0	0	0	0	0	0	0	0	0	38	16
5:45 PM	0	20	13	0	0	0	0	0	0	0	0	0	0	0	34	19

AM PEAK HOUR 7:45 AM to 8:45 AM	Middlesex Street Northbound				Dartmouth Street Southbound				Pleasant Street Eastbound				Pleasant Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**22**	**32**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**162**	**74**
PHF	**0.79**				**0.00**				**0.00**				**0.82**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**2.7%**

PM PEAK HOUR 4:00 PM to 5:00 PM	Middlesex Street Northbound				Dartmouth Street Southbound				Pleasant Street Eastbound				Pleasant Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**52**	**56**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**147**	**76**
PHF	**0.87**				**0.00**				**0.00**				**0.91**			
HV %	**0.0%**	**0.0%**	**1.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.7%**	**0.0%**

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 6
Location:	Malden, MA
Street 1:	Pleasant Street
Street 2:	Middlesex Street & Dartmouth Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

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HEAVY VEHICLES

	Middlesex Street Northbound				Dartmouth Street Southbound				Pleasant Street Eastbound				Pleasant Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1

	Middlesex Street Northbound				Dartmouth Street Southbound				Pleasant Street Eastbound				Pleasant Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

AM PEAK HOUR 7:00 AM to 8:00 AM	Middlesex Street Northbound				Dartmouth Street Southbound				Pleasant Street Eastbound				Pleasant Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**2**
PHF	**0.50**				**0.00**				**0.00**				**0.42**			

PM PEAK HOUR 5:00 PM to 6:00 PM	Middlesex Street Northbound				Dartmouth Street Southbound				Pleasant Street Eastbound				Pleasant Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**1**
PHF	**0.00**				**0.00**				**0.00**				**0.75**			

Client:	Mike White
Project #:	553_C68_HSH
BTD #:	Location 6
Location:	Malden, MA
Street 1:	Pleasant Street
Street 2:	Middlesex Street & Dartmouth Street
Count Date:	1/23/2020
Day of Week:	Thursday
Weather:	Mostly Sunny, 40°F

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PEDESTRIANS & BICYCLES

	Middlesex Street Northbound					Dartmouth Street Southbound					Pleasant Street Eastbound					Pleasant Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	5		0	0	0	8		0	0	0	6		0	1	0	1	
7:15 AM	0	0	0	3		0	0	0	9		0	0	0	8		0	0	0	4	
7:30 AM	0	0	0	4		0	0	0	26		0	0	0	20		0	0	2	7	
7:45 AM	0	0	0	19		0	0	0	25		0	0	0	19		0	0	0	9	
8:00 AM	0	0	0	13		0	0	0	14		0	0	0	17		0	0	1	9	
8:15 AM	0	0	0	9		0	0	0	16		0	0	0	21		0	1	0	2	
8:30 AM	0	0	0	12		0	0	0	17		0	0	0	23		0	0	1	3	
8:45 AM	0	0	0	19		0	0	0	20		0	0	0	20		0	0	1	8	

	Middlesex Street Northbound					Dartmouth Street Southbound					Pleasant Street Eastbound					Pleasant Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	30		0	0	0	32		0	0	0	27		0	1	0	13	
4:15 PM	0	0	0	27		0	0	0	17		0	0	0	20		0	0	0	8	
4:30 PM	0	0	0	18		0	0	0	21		0	0	0	28		0	0	0	11	
4:45 PM	0	0	0	20		0	0	0	28		0	0	0	34		0	1	0	6	
5:00 PM	0	0	0	32		0	0	0	23		0	0	0	21		0	0	0	6	
5:15 PM	0	0	0	23		0	0	0	24		0	0	0	19		0	0	0	5	
5:30 PM	0	0	0	24		0	0	0	15		0	0	0	22		0	0	0	5	
5:45 PM	0	0	0	31		0	0	0	20		0	0	0	25		0	0	1	13	

AM PEAK HOUR[1]	Middlesex Street Northbound					Dartmouth Street Southbound					Pleasant Street Eastbound					Pleasant Street Westbound				
7:45 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:45 AM	0	0	0	53		0	0	0	72		0	0	0	80		0	1	2	23	

PM PEAK HOUR[1]	Middlesex Street Northbound					Dartmouth Street Southbound					Pleasant Street Eastbound					Pleasant Street Westbound				
4:00 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:00 PM	0	0	0	95		0	0	0	98		0	0	0	109		0	2	0	38	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 1
Location:	Malden, MA
Street 1:	Florence Street
Street 2:	Washington Street
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Washington Street Northbound				Washington Street Southbound				Florence Street Eastbound				Florence Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	3	1	1	0	10	4	27	0	1	14	0	0	0	84	4
7:15 AM	0	7	6	6	0	13	4	28	1	3	18	1	0	2	80	4
7:30 AM	0	11	7	0	0	11	7	48	1	3	27	0	0	1	82	5
7:45 AM	0	12	6	7	0	12	18	40	1	12	21	0	0	2	87	5
8:00 AM	0	15	11	11	0	15	4	41	0	5	20	2	0	2	98	10
8:15 AM	0	10	8	5	0	14	5	38	0	11	28	0	0	0	75	4
8:30 AM	0	5	2	3	0	8	7	33	0	12	29	2	0	2	61	5
8:45 AM	0	6	2	4	0	7	4	31	1	4	28	4	0	0	58	5

	Washington Street Northbound				Washington Street Southbound				Florence Street Eastbound				Florence Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	18	2	17	0	6	10	11	0	22	48	0	0	1	43	6
4:15 PM	0	14	7	8	0	8	1	16	0	21	49	1	0	0	41	2
4:30 PM	0	13	7	6	0	9	3	12	1	22	40	1	0	1	57	6
4:45 PM	0	9	8	13	0	13	3	14	1	20	48	1	0	0	42	8
5:00 PM	0	7	11	9	0	14	1	11	1	16	54	0	0	1	43	5
5:15 PM	0	9	10	7	0	9	2	17	1	15	47	0	0	0	55	7
5:30 PM	0	9	14	10	0	15	2	14	1	11	49	2	0	0	48	7
5:45 PM	0	8	11	6	0	8	3	15	0	18	51	2	0	0	44	8

AM PEAK HOUR 7:30 AM to 8:30 AM	Washington Street Northbound				Washington Street Southbound				Florence Street Eastbound				Florence Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**48**	**32**	**23**	**0**	**52**	**34**	**167**	**2**	**31**	**96**	**2**	**0**	**5**	**342**	**24**
PHF	**0.70**				**0.90**				**0.84**				**0.84**			
HV %	**0.0%**	**2.1%**	**0.0%**	**4.3%**	**0.0%**	**7.7%**	**0.0%**	**1.2%**	**0.0%**	**9.7%**	**8.3%**	**0.0%**	**0.0%**	**0.0%**	**3.8%**	**0.0%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Washington Street Northbound				Washington Street Southbound				Florence Street Eastbound				Florence Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**34**	**43**	**39**	**0**	**51**	**8**	**56**	**4**	**62**	**198**	**3**	**0**	**1**	**188**	**27**
PHF	**0.88**				**0.93**				**0.94**				**0.87**			
HV %	**0.0%**	**0.0%**	**2.3%**	**2.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**3.5%**	**33.3%**	**0.0%**	**0.0%**	**4.8%**	**0.0%**

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 1
Location:	Malden, MA
Street 1:	Florence Street
Street 2:	Washington Street
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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HEAVY VEHICLES

	Washington Street Northbound				Washington Street Southbound				Florence Street Eastbound				Florence Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1
7:30 AM	0	0	0	0	0	2	0	2	0	0	3	0	0	0	2	0
7:45 AM	0	0	0	0	0	0	0	0	0	1	3	0	0	0	3	0
8:00 AM	0	1	0	1	0	1	0	0	0	1	1	0	0	0	5	0
8:15 AM	0	0	0	0	0	1	0	0	0	1	1	0	0	0	3	0
8:30 AM	0	0	0	0	0	0	0	0	0	1	2	0	0	0	2	0
8:45 AM	0	1	0	0	0	1	0	0	0	0	1	1	0	0	3	0

	Washington Street Northbound				Washington Street Southbound				Florence Street Eastbound				Florence Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	1	0	0	0	0	2	0	0	0	3	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
4:45 PM	0	0	0	1	0	0	0	0	0	0	2	0	0	0	3	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
5:15 PM	0	0	1	0	0	0	0	0	0	0	2	0	0	0	4	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	4	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Washington Street Northbound				Washington Street Southbound				Florence Street Eastbound				Florence Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**0**	**1**	**0**	**4**	**0**	**2**	**0**	**3**	**8**	**0**	**0**	**0**	**13**	**0**
PHF	**0.25**				**0.38**				**0.69**				**0.65**			

PM PEAK HOUR 4:30 PM to 5:30 PM	Washington Street Northbound				Washington Street Southbound				Florence Street Eastbound				Florence Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**10**	**0**
PHF	**0.50**				**0.00**				**1.00**				**0.63**			

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 1
Location:	Malden, MA
Street 1:	Florence Street
Street 2:	Washington Street
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

BOSTON TRAFFIC DATA
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PEDESTRIANS & BICYCLES

	Washington Street Northbound					Washington Street Southbound					Florence Street Eastbound					Florence Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	3		1	1	0	13		0	0	0	0		0	0	0	0	
7:15 AM	0	0	0	6		0	0	0	10		0	0	0	1		0	0	0	0	
7:30 AM	0	0	0	5		0	0	0	6		0	0	0	0		0	0	0	1	
7:45 AM	0	0	0	9		0	0	0	11		0	0	0	2		0	0	0	2	
8:00 AM	0	0	0	12		0	0	2	12		0	0	0	1		0	0	0	0	
8:15 AM	0	0	0	14		0	1	0	19		0	0	0	2		0	0	0	1	
8:30 AM	0	0	0	8		0	1	0	12		0	0	0	0		0	0	0	1	
8:45 AM	0	0	0	16		0	0	1	7		0	0	0	2		0	0	0	2	

	Washington Street Northbound					Washington Street Southbound					Florence Street Eastbound					Florence Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	3		0	0	0	16		0	0	0	0		0	0	0	2	
4:15 PM	0	0	0	7		0	0	0	8		0	0	0	3		0	0	0	5	
4:30 PM	0	0	0	7		0	0	0	11		0	0	0	4		0	0	0	1	
4:45 PM	0	0	1	5		0	0	0	19		0	0	0	4		0	0	0	3	
5:00 PM	0	0	0	7		0	0	0	10		0	0	0	1		0	0	0	4	
5:15 PM	0	1	0	5		0	0	0	11		0	0	0	2		0	0	0	2	
5:30 PM	0	0	0	7		0	0	0	8		0	0	0	8		0	0	0	4	
5:45 PM	0	0	0	8		0	0	0	13		0	1	0	2		0	0	0	2	

AM PEAK HOUR[1]	Washington Street Northbound					Washington Street Southbound					Florence Street Eastbound					Florence Street Westbound				
7:30 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:30 AM	0	0	0	40		0	1	2	48		0	0	0	5		0	0	0	4	

PM PEAK HOUR[1]	Washington Street Northbound					Washington Street Southbound					Florence Street Eastbound					Florence Street Westbound				
4:45 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:45 PM	0	1	1	24		0	0	0	48		0	0	0	15		0	0	0	13	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 2
Location:	Malden, MA
Street 1:	Florence Street
Street 2:	Ramsdell Road
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Ramsdell Road Northbound				Ramsdell Road Southbound				Florence Street Eastbound				Florence Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	5	0	3	0	2	24	0	0	0	83	0
7:15 AM	0	0	0	0	0	13	0	2	0	3	31	0	1	0	84	6
7:30 AM	0	0	0	0	0	21	0	4	0	3	42	0	0	0	80	9
7:45 AM	0	0	0	0	0	19	0	7	0	3	39	0	0	0	92	7
8:00 AM	0	0	0	0	0	13	0	3	0	5	36	0	0	0	107	17
8:15 AM	0	0	0	0	0	11	0	7	0	7	38	0	0	0	71	15
8:30 AM	0	0	0	0	0	15	0	14	1	6	34	0	0	0	54	16
8:45 AM	0	0	0	0	0	19	0	10	0	8	28	0	0	0	52	15

	Ramsdell Road Northbound				Ramsdell Road Southbound				Florence Street Eastbound				Florence Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	23	0	8	0	5	60	0	0	0	40	14
4:15 PM	0	0	0	0	0	18	0	11	0	9	58	0	0	0	33	13
4:30 PM	0	0	0	0	0	15	0	12	0	1	53	0	1	0	52	12
4:45 PM	0	0	0	0	0	20	0	11	0	9	61	0	0	0	39	8
5:00 PM	0	0	0	0	0	29	0	10	0	6	70	0	0	0	37	14
5:15 PM	0	0	0	0	0	27	0	11	0	6	57	0	1	0	51	15
5:30 PM	0	0	0	0	0	19	0	7	0	7	66	0	0	0	48	10
5:45 PM	0	0	0	0	0	24	0	9	0	4	60	0	0	0	45	11

AM PEAK HOUR 7:30 AM to 8:30 AM	Ramsdell Road Northbound				Ramsdell Road Southbound				Florence Street Eastbound				Florence Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**64**	**0**	**21**	**0**	**18**	**155**	**0**	**0**	**0**	**350**	**48**
PHF	**0.00**				**0.82**				**0.96**				**0.80**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.7%**	**0.0%**	**9.5%**	**0.0%**	**0.0%**	**8.4%**	**0.0%**	**0.0%**	**0.0%**	**3.7%**	**2.1%**

PM PEAK HOUR 5:00 PM to 6:00 PM	Ramsdell Road Northbound				Ramsdell Road Southbound				Florence Street Eastbound				Florence Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**99**	**0**	**37**	**0**	**23**	**253**	**0**	**1**	**0**	**181**	**50**
PHF	**0.00**				**0.87**				**0.91**				**0.87**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.3%**	**2.0%**	**0.0%**	**0.0%**	**0.0%**	**5.5%**	**0.0%**

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 2
Location:	Malden, MA
Street 1:	Florence Street
Street 2:	Ramsdell Road
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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HEAVY VEHICLES

	Ramsdell Road Northbound				Ramsdell Road Southbound				Florence Street Eastbound				Florence Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0
7:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3	0
7:30 AM	0	0	0	0	0	2	0	0	0	0	4	0	0	0	2	1
7:45 AM	0	0	0	0	0	0	0	1	0	0	4	0	0	0	4	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	5	0
8:15 AM	0	0	0	0	0	1	0	1	0	0	3	0	0	0	2	0
8:30 AM	0	0	0	0	0	1	0	1	0	0	2	0	0	0	2	1
8:45 AM	0	0	0	0	0	3	0	1	0	1	1	0	0	0	2	0

	Ramsdell Road Northbound				Ramsdell Road Southbound				Florence Street Eastbound				Florence Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	2
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
4:45 PM	0	0	0	0	0	1	0	0	0	1	1	0	0	0	3	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0
5:15 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	4	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Ramsdell Road Northbound				Ramsdell Road Southbound				Florence Street Eastbound				Florence Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**3**	**0**	**2**	**0**	**0**	**13**	**0**	**0**	**0**	**13**	**1**
PHF	**0.00**				**0.63**				**0.81**				**0.70**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Ramsdell Road Northbound				Ramsdell Road Southbound				Florence Street Eastbound				Florence Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**6**	**0**	**0**	**0**	**10**	**2**
PHF	**0.00**				**0.25**				**0.88**				**0.60**			

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 2
Location:	Malden, MA
Street 1:	Florence Street
Street 2:	Ramsdell Road
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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PEDESTRIANS & BICYCLES

	Ramsdell Road Northbound					Ramsdell Road Southbound					Florence Street Eastbound					Florence Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	0		0	0	0	7		0	0	0	0		0	0	0	1	
7:15 AM	0	0	0	0		0	0	0	7		0	1	0	0		0	0	0	2	
7:30 AM	0	0	0	0		0	0	0	7		0	1	0	1		0	0	0	0	
7:45 AM	0	0	0	0		0	0	0	8		0	0	0	0		0	0	0	0	
8:00 AM	0	0	0	0		0	0	0	7		0	0	0	0		0	0	0	4	
8:15 AM	0	0	0	0		0	0	0	11		0	0	0	0		0	1	0	1	
8:30 AM	0	0	0	0		0	0	0	8		0	0	0	0		0	0	0	1	
8:45 AM	0	0	0	0		0	0	0	7		0	0	0	1		0	0	0	2	

	Ramsdell Road Northbound					Ramsdell Road Southbound					Florence Street Eastbound					Florence Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	0		1	0	0	3		0	0	0	0		0	0	0	0	
4:15 PM	0	0	0	0		0	0	0	1		0	1	0	4		0	0	0	0	
4:30 PM	0	0	0	0		0	0	0	7		0	0	0	0		0	0	0	3	
4:45 PM	0	0	0	0		0	0	1	11		0	0	0	2		0	0	0	3	
5:00 PM	0	0	0	0		0	0	0	13		0	0	0	2		0	0	0	0	
5:15 PM	0	0	0	0		0	0	0	7		0	0	0	0		0	0	0	3	
5:30 PM	0	0	0	0		1	0	0	5		0	0	0	0		0	0	0	1	
5:45 PM	0	0	0	0		0	0	0	12		0	0	0	0		0	2	0	7	

AM PEAK HOUR[1] 7:30 AM to 8:30 AM	Ramsdell Road Northbound					Ramsdell Road Southbound					Florence Street Eastbound					Florence Street Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	0	0		0	0	0	33		0	1	0	1		0	1	0	5	

PM PEAK HOUR[1] 5:00 PM to 6:00 PM	Ramsdell Road Northbound					Ramsdell Road Southbound					Florence Street Eastbound					Florence Street Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	0	0		1	0	0	37		0	0	0	2		0	2	0	11	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 3
Location:	Malden, MA
Street 1:	Dartmouth Street
Street 2:	Ramsdell Road
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Dartmouth Street Northbound				Dartmouth Street Southbound				Parking Lot Driveway Eastbound				Ramsdell Road Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	1	7	1	0	4	5	3	0	1	2	0	0	0	0	1
7:15 AM	0	3	7	3	0	12	9	7	0	1	2	0	0	1	2	5
7:30 AM	0	2	12	7	0	20	6	7	0	1	0	0	0	3	1	6
7:45 AM	0	2	17	9	0	18	11	7	0	2	0	1	0	0	3	6
8:00 AM	0	0	16	2	0	12	22	12	0	1	1	0	0	4	6	12
8:15 AM	0	1	4	3	0	11	16	16	0	3	5	0	0	2	8	10
8:30 AM	0	4	12	5	0	17	7	13	0	5	4	0	0	3	11	7
8:45 AM	0	3	8	6	0	16	5	10	0	2	7	1	0	1	11	10

	Dartmouth Street Northbound				Dartmouth Street Southbound				Parking Lot Driveway Eastbound				Ramsdell Road Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	25	16	0	12	7	2	0	6	1	1	0	1	3	13
4:15 PM	0	3	24	7	0	15	5	4	0	10	6	0	0	2	4	12
4:30 PM	0	3	28	10	0	6	4	5	0	14	8	1	0	1	6	7
4:45 PM	0	1	22	10	0	15	6	3	0	6	7	0	0	1	7	9
5:00 PM	0	2	19	17	1	13	10	10	0	9	6	0	0	1	4	16
5:15 PM	0	3	24	7	2	18	9	12	0	8	10	1	0	1	1	18
5:30 PM	0	3	17	8	1	11	11	7	0	8	7	0	0	1	5	12
5:45 PM	0	3	17	10	0	11	4	10	0	8	12	0	0	1	3	12

AM PEAK HOUR 8:00 AM to 9:00 AM	Dartmouth Street Northbound				Dartmouth Street Southbound				Parking Lot Driveway Eastbound				Ramsdell Road Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**8**	**40**	**16**	**0**	**56**	**50**	**51**	**0**	**11**	**17**	**1**	**0**	**10**	**36**	**39**
PHF	**0.76**				**0.85**				**0.73**				**0.97**			
HV %	**0.0%**	**0.0%**	**2.5%**	**18.8%**	**0.0%**	**3.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**11.8%**	**0.0%**	**0.0%**	**10.0%**	**5.6%**	**0.0%**

PM PEAK HOUR 5:00 PM to 6:00 PM	Dartmouth Street Northbound				Dartmouth Street Southbound				Parking Lot Driveway Eastbound				Ramsdell Road Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**11**	**77**	**42**	**4**	**53**	**34**	**39**	**0**	**33**	**35**	**1**	**0**	**4**	**13**	**58**
PHF	**0.86**				**0.79**				**0.86**				**0.89**			
HV %	**0.0%**	**9.1%**	**2.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**10.3%**	**0.0%**	**9.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**7.7%**	**1.7%**

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 3
Location:	Malden, MA
Street 1:	Dartmouth Street
Street 2:	Ramsdell Road
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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HEAVY VEHICLES

	Dartmouth Street Northbound				Dartmouth Street Southbound				Parking Lot Driveway Eastbound				Ramsdell Road Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0
7:15 AM	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
7:30 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0
7:45 AM	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
8:15 AM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
8:30 AM	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0
8:45 AM	0	0	0	1	0	1	0	0	0	0	1	0	0	0	1	0

	Dartmouth Street Northbound				Dartmouth Street Southbound				Parking Lot Driveway Eastbound				Ramsdell Road Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
4:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0
5:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0
5:45 PM	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:00 AM to 8:00 AM	Dartmouth Street Northbound				Dartmouth Street Southbound				Parking Lot Driveway Eastbound				Ramsdell Road Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**3**	**3**	**0**	**1**	**0**	**1**	**0**	**2**	**1**	**0**	**0**	**1**	**0**	**0**
PHF	**0.75**				**0.25**				**0.38**				**0.25**			

PM PEAK HOUR 4:45 PM to 5:45 PM	Dartmouth Street Northbound				Dartmouth Street Southbound				Parking Lot Driveway Eastbound				Ramsdell Road Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**2**	**0**	**0**	**1**	**0**	**3**	**0**	**4**	**0**	**0**	**0**	**0**	**1**	**2**
PHF	**0.50**				**0.50**				**0.33**				**0.75**			

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 3
Location:	Malden, MA
Street 1:	Dartmouth Street
Street 2:	Ramsdell Road
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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PEDESTRIANS & BICYCLES

	Dartmouth Street Northbound					Dartmouth Street Southbound					Parking Lot Driveway Eastbound					Ramsdell Road Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
7:15 AM	0	0	0	0		0	0	0	1		0	0	0	1		0	0	0	0	
7:30 AM	0	0	0	1		0	0	0	0		0	0	0	4		0	0	0	1	
7:45 AM	0	0	0	1		0	0	0	0		0	0	0	3		0	0	0	2	
8:00 AM	0	0	0	0		0	0	0	2		0	0	0	2		0	0	0	3	
8:15 AM	0	0	0	1		0	0	0	0		0	0	0	1		0	0	0	0	
8:30 AM	0	0	0	5		0	0	0	0		0	0	0	4		0	0	0	4	
8:45 AM	0	0	0	11		0	0	0	0		0	0	0	4		0	0	0	4	

	Dartmouth Street Northbound					Dartmouth Street Southbound					Parking Lot Driveway Eastbound					Ramsdell Road Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	0		1	0	0	0		0	0	0	4		0	0	0	5	
4:15 PM	0	0	0	0		0	0	0	2		0	0	0	3		0	0	0	14	
4:30 PM	0	0	0	5		0	0	0	0		0	0	0	18		0	0	0	8	
4:45 PM	0	0	0	3		1	0	0	0		0	0	0	6		0	0	0	3	
5:00 PM	0	0	0	0		0	0	0	2		0	0	0	4		0	0	0	0	
5:15 PM	0	0	0	1		0	0	0	2		0	0	0	1		0	0	0	3	
5:30 PM	0	0	0	1		1	0	0	0		0	0	0	2		0	0	0	2	
5:45 PM	0	0	0	0		0	0	0	0		0	0	0	4		0	0	0	8	

AM PEAK HOUR[1]	Dartmouth Street Northbound					Dartmouth Street Southbound					Parking Lot Driveway Eastbound					Ramsdell Road Westbound				
8:00 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
9:00 AM	0	0	0	17		0	0	0	2		0	0	0	11		0	0	0	11	

PM PEAK HOUR[1]	Dartmouth Street Northbound					Dartmouth Street Southbound					Parking Lot Driveway Eastbound					Ramsdell Road Westbound				
5:00 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
6:00 PM	0	0	0	2		1	0	0	4		0	0	0	11		0	0	0	13	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 4
Location:	Malden, MA
Street 1:	Dartmouth Street
Street 2:	Mountain Avenue
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Dartmouth Street Northbound				Dartmouth Street Southbound				Mountain Avenue Eastbound				Mountain Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	9	0	3	0	0	0	0	0	0	28	10	0	4	57	0
7:15 AM	0	6	0	4	0	0	0	0	0	0	37	15	0	16	74	0
7:30 AM	0	12	0	5	0	0	0	0	0	0	61	26	0	13	108	0
7:45 AM	0	17	0	7	0	0	0	0	0	0	67	25	0	12	88	0
8:00 AM	0	13	0	16	0	0	0	0	0	0	50	26	0	19	89	0
8:15 AM	0	9	0	8	0	0	0	0	0	0	47	27	0	21	83	0
8:30 AM	0	12	0	16	0	0	0	0	0	0	36	18	0	17	50	0
8:45 AM	0	10	0	11	0	0	0	0	0	0	31	16	0	13	57	0

	Dartmouth Street Northbound				Dartmouth Street Southbound				Mountain Avenue Eastbound				Mountain Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	22	0	26	0	0	0	0	0	0	37	9	0	11	34	0
4:15 PM	0	16	0	27	0	0	0	0	0	0	53	13	0	12	54	0
4:30 PM	0	21	0	27	0	0	0	0	0	0	62	11	0	12	42	0
4:45 PM	0	10	0	29	0	0	0	0	0	0	74	16	0	8	31	0
5:00 PM	0	25	0	19	0	0	0	0	0	0	58	23	0	13	43	0
5:15 PM	0	23	0	33	0	0	0	0	0	0	57	22	0	16	42	0
5:30 PM	0	20	0	19	0	0	0	0	0	0	79	19	0	12	55	0
5:45 PM	0	22	0	16	0	0	0	0	0	0	71	12	0	14	44	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Dartmouth Street Northbound				Dartmouth Street Southbound				Mountain Avenue Eastbound				Mountain Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**51**	**0**	**36**	**0**	**0**	**0**	**0**	**0**	**0**	**225**	**104**	**0**	**65**	**368**	**0**
PHF	**0.75**				**0.00**				**0.89**				**0.89**			
HV %	**0.0%**	**0.0%**	**0.0%**	**2.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**2.7%**	**0.0%**	**0.0%**	**0.0%**	**0.5%**	**0.0%**

PM PEAK HOUR 5:00 PM to 6:00 PM	Dartmouth Street Northbound				Dartmouth Street Southbound				Mountain Avenue Eastbound				Mountain Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**90**	**0**	**87**	**0**	**0**	**0**	**0**	**0**	**0**	**265**	**76**	**0**	**55**	**184**	**0**
PHF	**0.79**				**0.00**				**0.87**				**0.89**			
HV %	**0.0%**	**2.2%**	**0.0%**	**4.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.4%**	**2.6%**	**0.0%**	**5.5%**	**0.0%**	**0.0%**

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 4
Location:	Malden, MA
Street 1:	Dartmouth Street
Street 2:	Mountain Avenue
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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HEAVY VEHICLES

	Dartmouth Street Northbound				Southbound				Mountain Avenue Eastbound				Mountain Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0
7:15 AM	0	0	0	1	0	0	0	0	0	0	2	0	0	0	2	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0
7:45 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0
8:30 AM	0	0	0	1	0	0	0	0	0	0	2	0	0	1	1	0
8:45 AM	0	0	0	1	0	0	0	0	0	0	2	0	0	0	2	0

	Dartmouth Street Northbound				Southbound				Mountain Avenue Eastbound				Mountain Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	1	0	0	0	0	0	0	1	0	0	2	1	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4:30 PM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0
4:45 PM	0	0	0	2	0	0	0	0	0	0	1	0	0	0	1	0
5:00 PM	0	2	0	2	0	0	0	0	0	0	1	0	0	2	0	0
5:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5:45 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Dartmouth Street Northbound				Southbound				Mountain Avenue Eastbound				Mountain Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**1**	**4**	**0**
PHF	**0.50**				**0.00**				**0.58**				**0.63**			

PM PEAK HOUR 4:30 PM to 5:30 PM	Dartmouth Street Northbound				Southbound				Mountain Avenue Eastbound				Mountain Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**2**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**2**	**0**
PHF	**0.50**				**0.00**				**0.75**				**0.63**			

Client:	Mike White
Project #:	578_C74_HSH
BTD #:	Location 4
Location:	Malden, MA
Street 1:	Dartmouth Street
Street 2:	Mountain Avenue
Count Date:	3/5/2020
Day of Week:	Thursday
Weather:	Sunny, 45°F

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PEDESTRIANS & BICYCLES

	Dartmouth Street Northbound					Southbound					Mountain Avenue Eastbound					Mountain Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	2		0	0	0	0		0	0	0	0		0	0	0	5	
7:15 AM	0	0	0	9		0	0	0	0		0	1	0	0		0	0	0	4	
7:30 AM	0	0	0	13		0	0	0	0		0	0	0	0		0	0	0	5	
7:45 AM	0	0	0	13		0	0	0	0		0	0	0	0		0	0	0	7	
8:00 AM	0	0	0	17		0	0	0	0		0	0	0	0		0	0	0	3	
8:15 AM	0	0	0	17		0	0	0	0		0	0	0	0		0	0	0	6	
8:30 AM	0	0	0	6		0	0	0	0		0	0	0	0		0	0	0	1	
8:45 AM	0	0	0	9		0	0	0	0		0	0	0	0		0	0	0	8	

	Dartmouth Street Northbound					Southbound					Mountain Avenue Eastbound					Mountain Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	10		0	0	0	0		0	0	0	0		0	0	0	8	
4:15 PM	0	0	0	5		0	0	0	0		0	2	0	0		0	0	0	10	
4:30 PM	0	0	0	10		0	0	0	0		0	0	1	1		0	0	0	4	
4:45 PM	0	0	0	11		0	0	0	0		0	0	0	0		0	0	0	7	
5:00 PM	0	0	0	5		0	0	0	0		0	0	1	0		0	0	0	5	
5:15 PM	0	0	0	15		0	0	0	0		0	1	0	0		0	0	0	8	
5:30 PM	0	0	0	23		0	0	0	0		0	0	0	1		0	0	0	0	
5:45 PM	0	0	0	19		0	0	0	0		0	0	0	0		0	1	0	3	

AM PEAK HOUR[1]	Dartmouth Street Northbound					Southbound					Mountain Avenue Eastbound					Mountain Avenue Westbound				
7:30 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:30 AM	0	0	0	60		0	0	0	0		0	0	0	0		0	0	0	21	

PM PEAK HOUR[1]	Dartmouth Street Northbound					Southbound					Mountain Avenue Eastbound					Mountain Avenue Westbound				
5:00 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
6:00 PM	0	0	0	62		0	0	0	0		0	1	1	1		0	1	0	16	

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

HOWARD STEIN HUDSON

Engineers + Planners

Appendix B

Crash Data

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

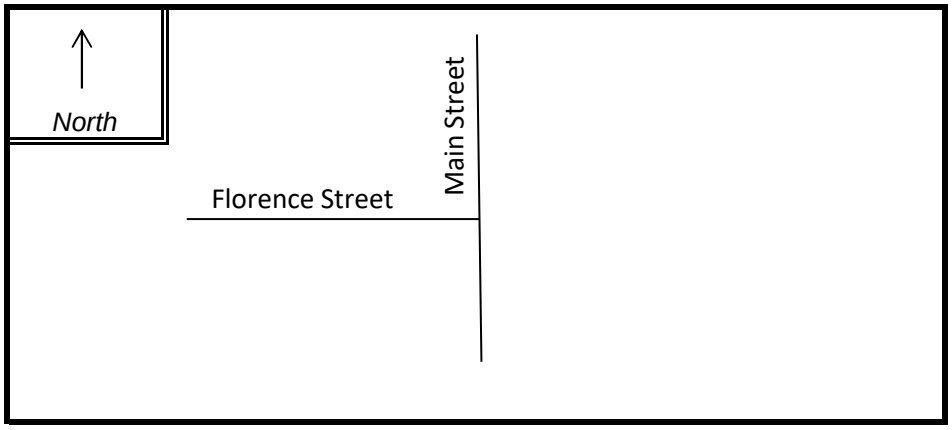
DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Florence Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :	327		465	368		**1,160**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **12,889**

TOTAL # OF CRASHES : 7

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **2.33**

CRASH RATE CALCULATION : **0.50**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Does not exceed District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

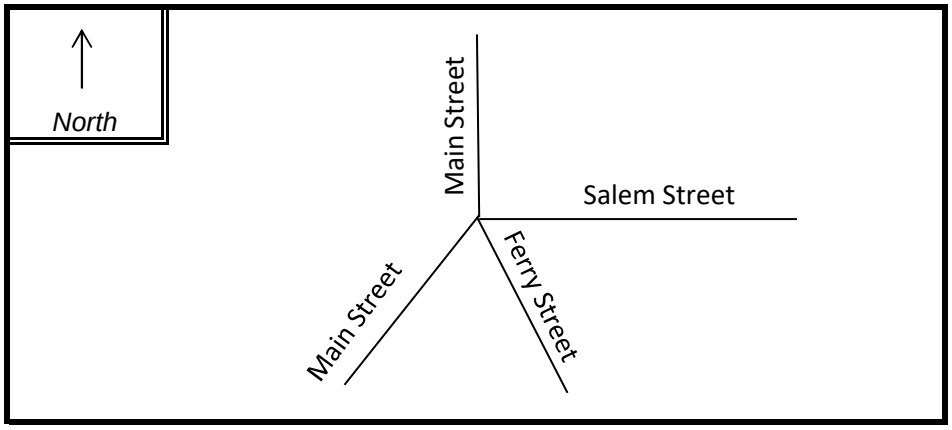
~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Salem Street

Ferry Street

INTERSECTION DIAGRAM
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	↗	←	↖	↓		
PEAK HOURLY VOLUMES (PM) :	538	461	380	496		**1,875**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **20,833**

TOTAL # OF CRASHES : 20

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **6.67**

CRASH RATE CALCULATION : **0.88**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Exceeds District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

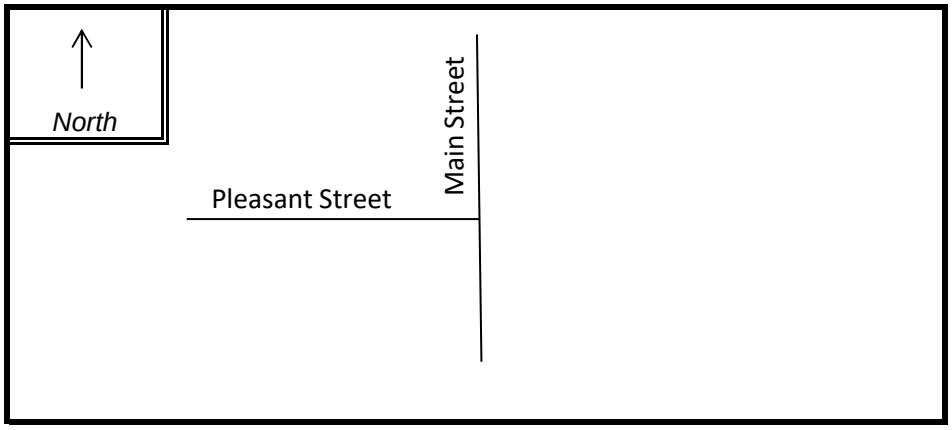
DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Pleasant Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :			643	420		**1,063**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **11,811**

TOTAL # OF CRASHES : 13

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **4.33**

CRASH RATE CALCULATION : 1.01

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Does not exceed District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

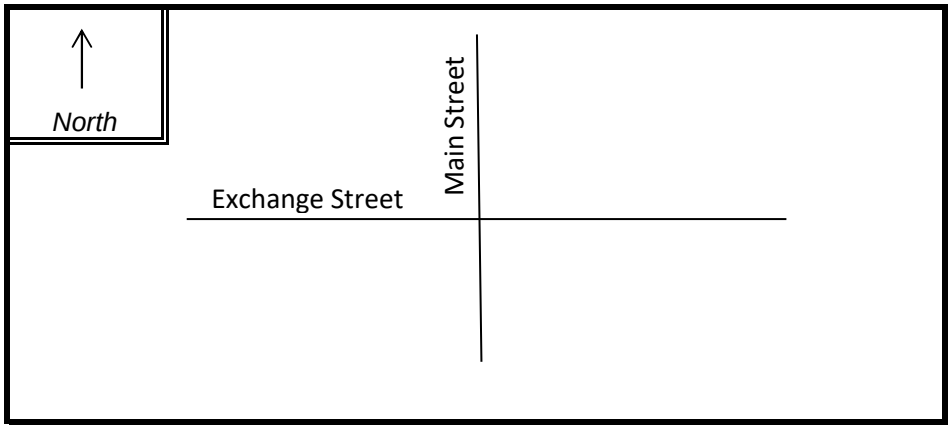
DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Exchange Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :	238		535	306		**1,079**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **11,989**

TOTAL # OF CRASHES : 9

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **3.00**

CRASH RATE CALCULATION : **0.69**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Does not exceed District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden COUNT DATE : Jan-20

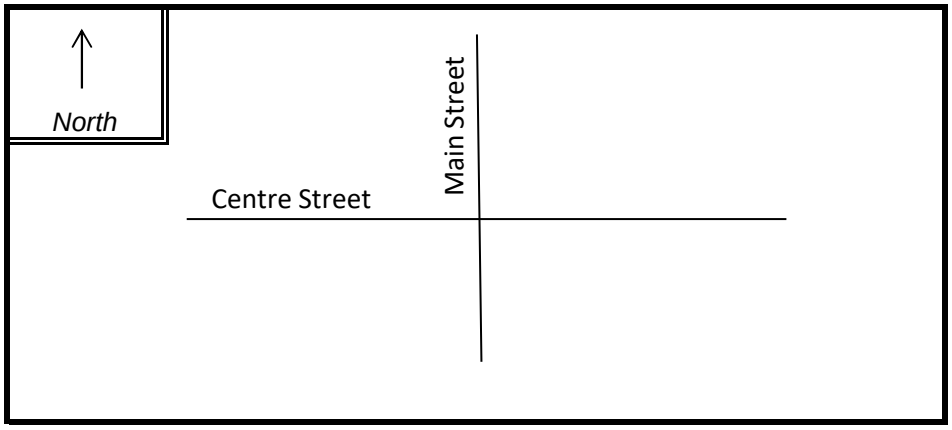
DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Centre Street

MINOR STREET(S) : Main Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :	860	535	667	396		**2,458**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **27,311**

TOTAL # OF CRASHES : 47 # OF YEARS : 3 AVERAGE # OF CRASHES PER YEAR (**A**) : **15.67**

CRASH RATE CALCULATION : **1.57** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Exceeds District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

DISTRICT : 4 | UNSIGNALIZED : X | SIGNALIZED :

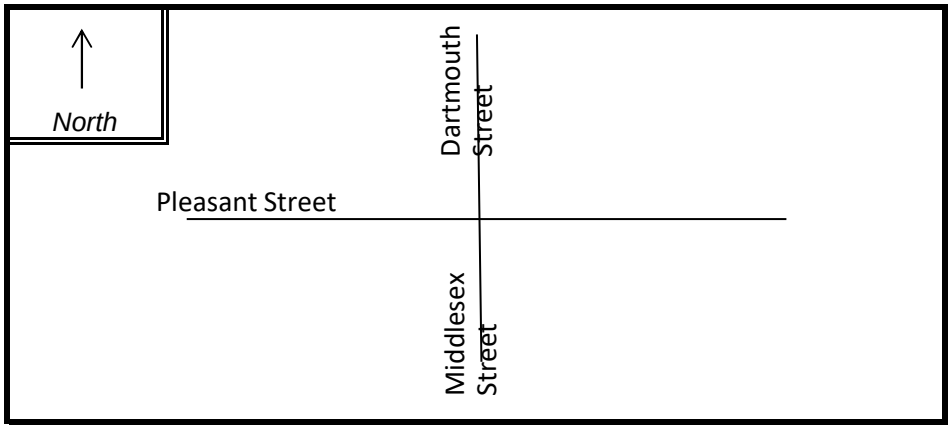
~ INTERSECTION DATA ~

MAJOR STREET : Plesant Street

MINOR STREET(S) : Middlesex Street

Dartmouth Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :		223	108			**331**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **3,678**

TOTAL # OF CRASHES : 4

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **1.33**

CRASH RATE CALCULATION : **0.99**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Exceeds the District 4 average crash rate of 0.57 crashes per entering vehicles at unsignalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

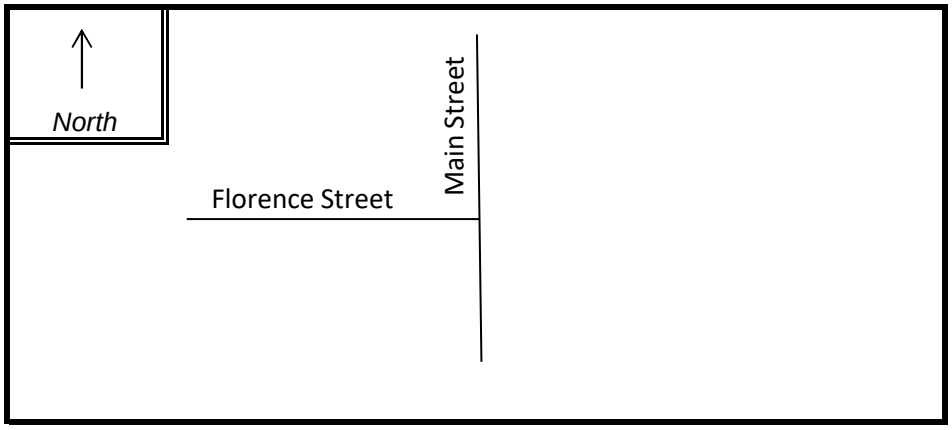
DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Florence Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :	327		465	368		**1,160**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **12,889**

TOTAL # OF CRASHES : 8

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **2.67**

CRASH RATE CALCULATION : **0.57**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Does not exceed District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

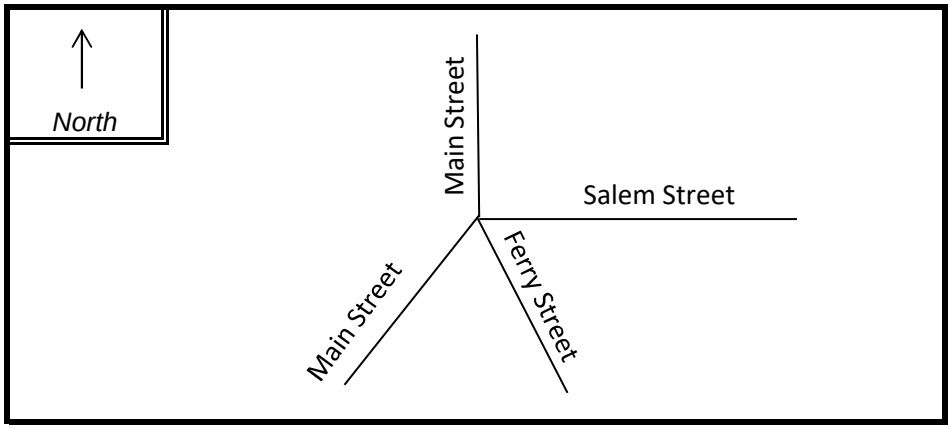
~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Salem Street

Ferry Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	↗	←	↖	↓		
PEAK HOURLY VOLUMES (PM) :	538	461	380	496		**1,875**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **20,833**

TOTAL # OF CRASHES : 21

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **7.00**

CRASH RATE CALCULATION : **0.92**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Exceeds District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

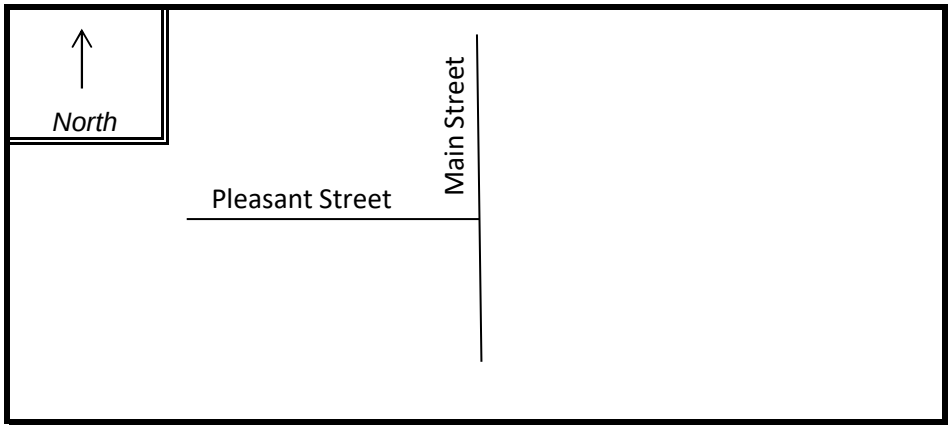
DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Pleasant Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :			643	420		**1,063**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **11,811**

TOTAL # OF CRASHES : 15

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **5.00**

CRASH RATE CALCULATION : 1.16

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Exceeds District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

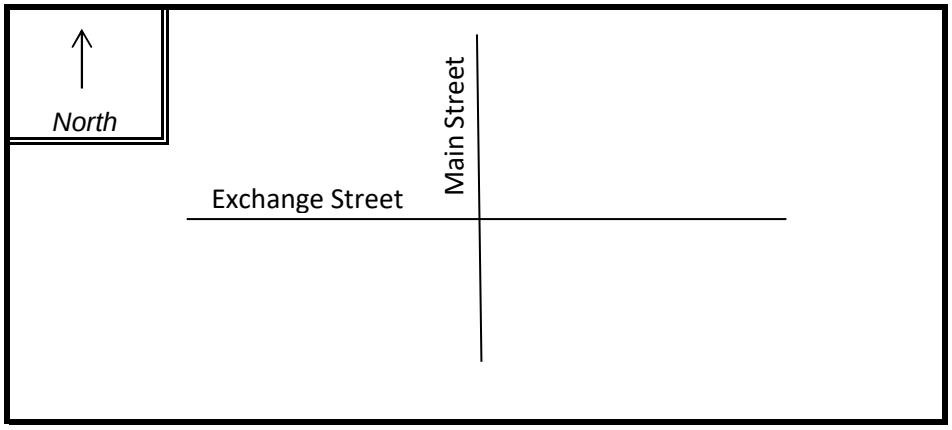
DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

MINOR STREET(S) : Exchange Street

INTERSECTION DIAGRAM
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :	238		535	306		**1,079**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **11,989**

TOTAL # OF CRASHES : 6

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **2.00**

CRASH RATE CALCULATION : **0.46**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Does not exceed District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

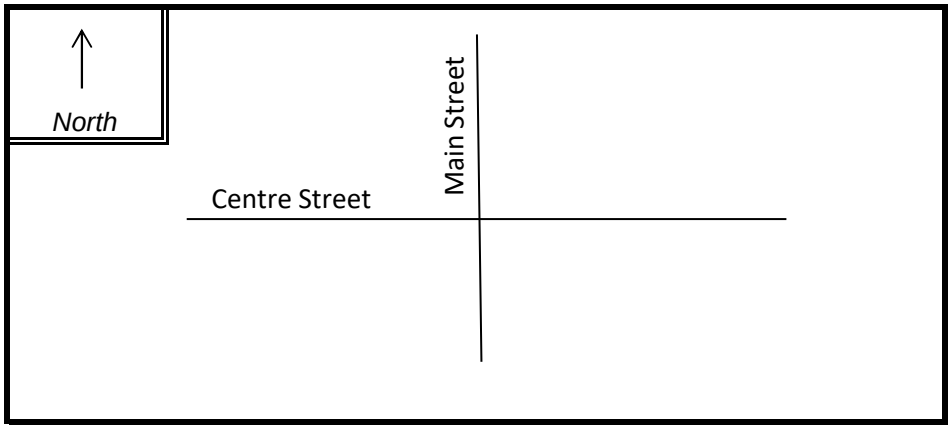
DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Centre Street

MINOR STREET(S) : Main Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :	860	535	667	396		**2,458**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **27,311**

TOTAL # OF CRASHES : 39

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **13.00**

CRASH RATE CALCULATION : **1.30**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Exceeds District 4 average crash rate of 0.73 crashes per entering vehicles at signalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Malden | COUNT DATE : Jan-20

DISTRICT : 4 | UNSIGNALIZED : X | SIGNALIZED :

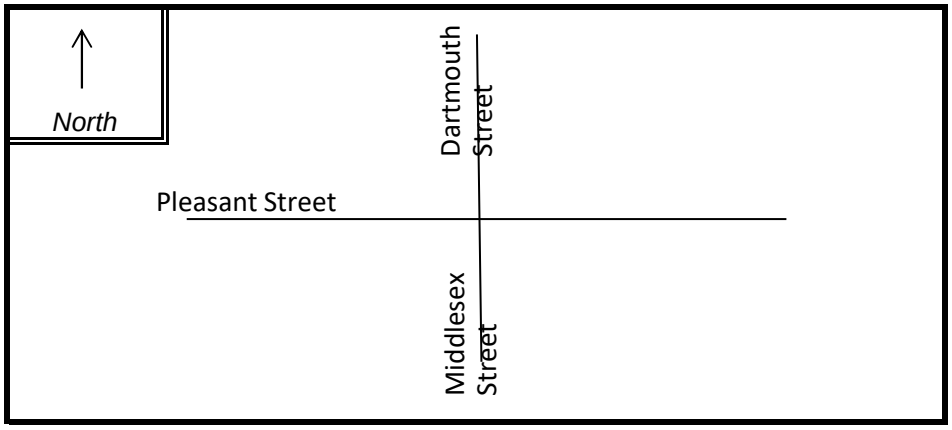
~ INTERSECTION DATA ~

MAJOR STREET : Plesant Street

MINOR STREET(S) : Middlesex Street

Dartmouth Street

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	→	←	↑	↓		
PEAK HOURLY VOLUMES (PM) :		223	108			**331**

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **3,678**

TOTAL # OF CRASHES : 1

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **0.33**

CRASH RATE CALCULATION : **0.25**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Does not exceed the District 4 average crash rate of 0.57 crashes per entering vehicles at unsignalized intersections.

Project Title & Date: 11 Dartmouth Street, Malden. 02/17/2020

HOWARD STEIN HUDSON

Engineers + Planners

Appendix C

Trip Generation

19251 - 11 Dartmouth St - Existing Office Building

Trip Generation Assessment

HOWARD STEIN HUDSON
17-Mar-2020

XXX Means Columns U, X, and AA do not sum to Column R; hard code adjustements are needed
XX HARD CODED TO BALANCE (Manually change formatting)

Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Assumed National Vehicle Occupancy Rate[1]	Unadjusted Person-Trips	Internal Capture Person-Trips[2]	Primary Person-Trips	Transit Share[3]	Transit Person-Trips	Walk/Bike/ Other Share[3]	Walk/ Bike/ Other Trips	Auto Share[3]	Auto Person-Trips	% Taxi/ TNC[4]	Taxi/TNC Person-Trips	Assumed Local Auto Occupancy Rate for Taxis[6]	Private Auto Person-Trips	Primary Auto-Person Trips	Assumed Local Auto Occupancy Rate[5]	Taxi/TNC Auto Trips	Prinary Non-Taxi Auto Trips	Primary AutoTrips
Daily Peak Hour																								
Office Building[11]	17.124	Total		9.740	166	1.18	**196**	0	**196**	21%	**42**	13%	**26**	66%	**128**	3%	4	1.18	124	124	1.18	**8**	**106**	**114**
	KSF	In	50%	4.870	83	1.18	**98**		**98**	21%	**21**	13%	**13**	66%	**64**	3%	2	1.18	62	62	1.18	**4**	**53**	**57**
		Out	50%	4.870	83	1.18	**98**		**98**	21%	**21**	13%	**13**	66%	**64**	3%	2	1.18	62	62	1.18	**4**	**53**	**57**
Total		Total			**166**		**196**	**0**	**196**		**42**		**26**		**128**							**8**		**114**
		In			**83**		**98**	**0**	**98**		**21**		**13**		**64**							**4**		**57**
		Out			**83**		**98**	**0**	**98**		**21**		**13**		**64**							**4**		**57**
AM Peak Hour																								
Office Building[11]	17.124	Total		1.16	20	1.18	**24**	0	**24**	21%	**5**	13%	**4**	66%	**15**	3%	0	1.18	15	15	1.18	**0**	**13**	**13**
	KSF	In	86%	0.998	17	1.18	**20**		**20**	21%	**4**	13%	**3**	66%	**13**	3%	0	1.18	13	13	1.18	**0**	**11**	**11**
		Out	14%	0.162	3	1.18	**4**		**4**	21%	**1**	13%	**1**	66%	**2**	3%	0	1.18	2	2	1.18	**0**	**2**	**2**
Total		Total			**20**		**24**	**0**	**24**		**5**		**4**		**15**							**0**		**13**
		In			**17**		**20**	**0**	**20**		**4**		**3**		**13**							**0**		**11**
		Out			**3**		**4**	**0**	**4**		**1**		**1**		**2**							**0**		**2**
PM Peak Hour																								
Office Building[11]	17.124	Total		1.15	20	1.18	**24**	0	**24**	21%	**5**	13%	**4**	66%	**15**	3%	0	1.18	15	15	1.18	**0**	**13**	**13**
	KSF	In	16%	0.184	3	1.18	**4**		**4**	21%	**1**	13%	**1**	66%	**2**	3%	0	1.18	2	2	1.18	**0**	**2**	**2**
		Out	84%	0.966	17	1.18	**20**		**20**	21%	**4**	13%	**3**	66%	**13**	3%	0	1.18	13	13	1.18	**0**	**11**	**11**
Total		Total			**20**		**24**	**0**	**24**		**5**		**4**		**15**							**0**		**13**
		In			**3**		**4**	**0**	**4**		**1**		**1**		**2**							**0**		**2**
		Out			**17**		**20**	**0**	**20**		**4**		**3**		**13**							**0**		**11**

1. 2017 National vehicle occupancy rates - 1.18:home to work; 1.82: family/personal business; 1.82: shopping; 2.1 social/recreational
2. Based on ITE Trip Generation Handbook, 3rd Edition method
3. Mode shares based on peak-hour BTD Data for Area 1
4. Vehicle Trips = 70% Private Auto and 30% Taxi. Taxi trip rate based on CTPS Taxi activity rates for Hotel lane use, as adopted by Central Artery/Tunnel Project
5. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates
6. For taxi cabs, 1.2 passengers per cab. (2.2 minus 1 driver equals 1.2)
7. ITE Trip Generation Manual, 10th Edition, LUC 220 (Multifamily Housing Low-Rise (1-2 floors), average rate
8. ITE Trip Generation Manual, 10th Edition, LUC 221 (Multifamily Housing Mid-Rise (3-10 floors)), average rate
9. ITE Trip Generation Manual, 10th Edition, LUC 222 (Multifamily Housing High-Rise (11+ Floors)), average rate
10. ITE Trip Generation Manual, 10th Edition, LUC 310 (Hotel), average rate
11. ITE Trip Generation Manual, 10th Edition, LUC 710 (General Office Building), average rate
12. ITE Trip Generation Manual, 10th Edition, LUC 760 (Research & Development Center), average rate
13. ITE Trip Generation Manual, 10th Edition, LUC 820 (Shopping Center), average rate
14. ITE Trip Generation Manual, 10th Edition, LUC 850 (Supermarket), average rate
15. ITE Trip Generation Manual, 10th Edition, LUC 931 (Quality Restaurant), average rate
16. ITE Trip Generation Manual, 10th Edition, LUC 932 (High-Turnover (Sit-Down) Restaurant), average rate

19251 - 11 Dartmouth St - Proposed Building Program
Trip Generation Assessment

HOWARD STEIN HUDSON
17-Mar-2020

XXX Means Columns U, X, and AA do not sum to Column R; hard code adjustements are needed
XX HARD CODED TO BALANCE (Manually change formatting)

Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Assumed National Vehicle Occupancy Rate[1]	Unadjusted Person-Trips	Internal Capture Person-Trips[2]	Primary Person-Trips	Transit Share[3]	Transit Person-Trips	Walk/Bike/ Other Share[3]	Walk/ Bike/ Other Trips	Auto Share[3]	Auto Person-Trips	% Taxi/ TNC[4]	Taxi/TNC Person-Trips	Assumed Local Auto Occupancy Rate for Taxis[6]	Private Auto Person-Trips	Pass-By Percentage	Pass-By Person Trips	Primary Auto-Person Trips	Assumed Local Auto Occupancy Rate[5]	Taxi/TNC Auto Trips	Pass-By Auto-Trips	Prinary Non-Taxi Auto Trips	Primary AutoTrips
Daily Peak Hour																											
Office Building[11]	153.711	Total		9.740	1,498	1.18	**1,768**	0	**1,768**	21%	**372**	13%	**230**	66%	**1,166**	3%	34	1.18	1,132		0	1132	1.18	**56**	**0**	**960**	**1,016**
	KSF	In	50%	4.870	749	1.18	**884**		**884**	21%	**186**	13%	**115**	66%	**583**	3%	17	1.18	566	0%	0	566	1.18	**28**	**0**	**480**	**508**
		Out	50%	4.870	749	1.18	**884**		**884**	21%	**186**	13%	**115**	66%	**583**	3%	17	1.18	566	0%	0	566	1.18	**28**	**0**	**480**	**508**
Shopping Center[13]	2.85	Total		37.750	108	1.82	**196**	0	**196**	10%	**20**	20%	**40**	70%	**136**		0	1.82	136		0	136	1.82	**0**	**0**	**74**	**74**
	KSF	In	50%	18.875	54	1.82	**98**		**98**	10%	**10**	20%	**20**	70%	**68**	0%	0	1.82	68	0%	0	68	1.82	**0**	**0**	**37**	**37**
		Out	50%	18.875	54	1.82	**98**		**98**	10%	**10**	20%	**20**	70%	**68**	0%	0	1.82	68	0%	0	68	1.82	**0**	**0**	**37**	**37**
Total		Total			**1,606**		**1,964**	**0**	**1,964**		**392**		**270**		**1,302**									**56**	**0**		**1,090**
		In			**803**		**982**	**0**	**982**		**196**		**135**		**651**									**28**	**0**		**545**
		Out			**803**		**982**	**0**	**982**		**196**		**135**		**651**									**28**	**0**		**545**
AM Peak Hour																											
Office Building[11]	153.711	Total		1.16	178	1.18	**211**	0	**211**	21%	**44**	13%	**28**	66%	**139**	3%	5	1.18	134		0	134	1.18	**8**	**0**	**113**	**121**
	KSF	In	86%	0.998	153	1.18	**181**		**181**	21%	**38**	13%	**24**	66%	**119**	3%	4	1.18	115	0%	0	115	1.18	**4**	**0**	**97**	**101**
		Out	14%	0.162	25	1.18	**30**		**30**	21%	**6**	13%	**4**	66%	**20**	3%	1	1.18	19	0%	0	19	1.18	**4**	**0**	**16**	**20**
Shopping Center[13]	2.85	Total		0.94	3	1.82	**6**	0	**6**	10%	**0**	20%	**1**	70%	**5**		0	1.82	5		0	5	1.82	**0**	**0**	**3**	**3**
	KSF	In	62%	0.583	2	1.82	**4**		**4**	10%	**0**	20%	**1**	70%	**3**	0%	0	1.82	3	0%	0	3	1.82	**0**	**0**	**2**	**2**
		Out	38%	0.357	1	1.82	**2**		**2**	10%	**0**	20%	**0**	70%	**2**	0%	0	1.82	2	0%	0	2	1.82	**0**	**0**	**1**	**1**
Total		Total			**181**		**217**	**0**	**217**		**44**		**29**		**144**									**8**	**0**		**124**
		In			**155**		**185**	**0**	**185**		**38**		**25**		**122**									**4**	**0**		**103**
		Out			**26**		**32**	**0**	**32**		**6**		**4**		**22**									**4**	**0**		**21**
PM Peak Hour																											
Office Building[11]	153.711	Total		1.15	176	1.18	**208**	0	**208**	21%	**44**	13%	**27**	66%	**137**	3%	4	1.18	133		0	133	1.18	**8**	**0**	**113**	**121**
	KSF	In	16%	0.184	28	1.18	**33**		**33**	21%	**7**	13%	**4**	66%	**22**	3%	1	1.18	21	0%	0	21	1.18	**4**	**0**	**18**	**22**
		Out	84%	0.966	148	1.18	**175**		**175**	21%	**37**	13%	**23**	66%	**115**	3%	3	1.18	112	0%	0	112	1.18	**4**	**0**	**95**	**99**
Shopping Center[13]	2.85	Total		3.81	11	1.82	**20**	0	**20**	10%	**2**	20%	**4**	70%	**14**		0	1.82	14		0	14	1.82	**0**	**0**	**7**	**7**
	KSF	In	48%	1.829	5	1.82	**9**		**9**	10%	**1**	20%	**2**	70%	**6**	0%	0	1.82	6	0%	0	6	1.82	**0**	**0**	**3**	**3**
		Out	52%	1.981	6	1.82	**11**		**11**	10%	**1**	20%	**2**	70%	**8**	0%	0	1.82	8	0%	0	8	1.82	**0**	**0**	**4**	**4**
Total		Total			**187**		**228**	**0**	**228**		**46**		**31**		**151**									**8**	**0**		**128**
		In			**33**		**42**	**0**	**42**		**8**		**6**		**28**									**4**	**0**		**25**
		Out			**154**		**186**	**0**	**186**		**38**		**25**		**123**									**4**	**0**		**103**

1. 2017 National vehicle occupancy rates - 1.18:home to work; 1.82: family/personal business; 1.82: shopping; 2.1 social/recreational
2. Based on ITE Trip Generation Handbook, 3rd Edition method
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7. ITE Trip Generation Manual, 10th Edition, LUC 220 (Multifamily Housing Low-Rise (1-2 floors), average rate
8. ITE Trip Generation Manual, 10th Edition, LUC 221 (Multifamily Housing Mid-Rise (3-10 floors)), average rate
9. ITE Trip Generation Manual, 10th Edition, LUC 222 (Multifamily Housing High-Rise (11+ Floors)), average rate
10. ITE Trip Generation Manual, 10th Edition, LUC 310 (Hotel), average rate
11. ITE Trip Generation Manual, 10th Edition, LUC 710 (General Office Building), average rate
12. ITE Trip Generation Manual, 10th Edition, LUC 760 (Research & Development Center), average rate
13. ITE Trip Generation Manual, 10th Edition, LUC 820 (Shopping Center), average rate
14. ITE Trip Generation Manual, 10th Edition, LUC 850 (Supermarket), average rate
15. ITE Trip Generation Manual, 10th Edition, LUC 931 (Quality Restaurant), average rate
16. ITE Trip Generation Manual, 10th Edition, LUC 932 (High-Turnover (Sit-Down) Restaurant), average rate

HOWARD STEIN HUDSON

Engineers + Planners

Appendix D

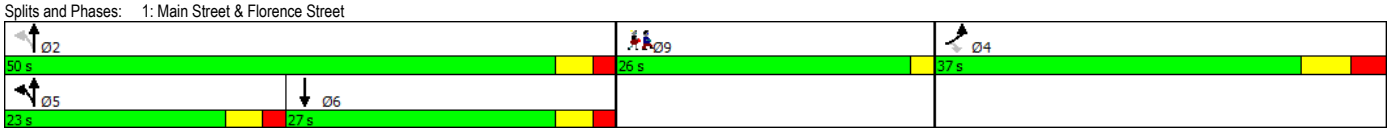
Intersection LOS/Synchro Report

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2	Ø9
Lane Configurations								
Traffic Volume (vph)	61	160	230	244	284	147		
Future Volume (vph)	61	160	230	244	284	147		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	10	13	13	11		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor	0.96	0.96		1.00	0.97			
Frt		0.850			0.954			
Flt Protected	0.950			0.976				
Satd. Flow (prot)	1687	1568	0	1825	1762	0		
Flt Permitted	0.950			0.238				
Satd. Flow (perm)	1617	1508	0	443	1762	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)		184			20			
Link Speed (mph)	30			30	30			
Link Distance (ft)	284			528	324			
Travel Time (s)	6.5			12.0	7.4			
Confl. Peds. (#/hr)	22	10	17			17		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.87	0.87	0.89	0.89	0.94	0.94		
Heavy Vehicles (%)	7%	3%	5%	5%	5%	1%		
Adj. Flow (vph)	70	184	258	274	302	156		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	70	184	0	532	458	0		
Turn Type	Prot	Perm	custom	NA	NA			
Protected Phases	4		5	2 5	6		2	9
Permitted Phases		4	2					
Detector Phase	4	4	5	2 5	6			
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0		4.0		16.0	4.0
Minimum Split (s)	15.0	15.0	13.0		9.0		21.0	26.0
Total Split (s)	37.0	37.0	23.0		27.0		50.0	26.0
Total Split (%)	32.7%	32.7%	20.4%		23.9%		44%	23%
Maximum Green (s)	30.0	30.0	18.0		22.0		45.0	24.0
Yellow Time (s)	4.0	4.0	3.0		3.0		3.0	2.0
All-Red Time (s)	3.0	3.0	2.0		2.0		2.0	0.0
Lost Time Adjust (s)	0.0	0.0			0.0			
Total Lost Time (s)	7.0	7.0			5.0			
Lead/Lag			Lead		Lag			
Lead-Lag Optimize?			Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0
Recall Mode	None	None	None		Max		Max	None
Walk Time (s)								6.0
Flash Dont Walk (s)								18.0
Pedestrian Calls (#/hr)								15
Act Effct Green (s)	9.4	9.4		46.0	22.5			
Actuated g/C Ratio	0.13	0.13		0.64	0.31			
v/c Ratio	0.32	0.52		0.83	0.81			
Control Delay	34.7	11.3		26.4	37.1			
Queue Delay	0.0	0.0		0.0	0.0			
Total Delay	34.7	11.3		26.4	37.1			
LOS	C	B		C	D			
Approach Delay	17.8			26.4	37.1			
Approach LOS	B			C	D			
Queue Length 50th (ft)	26	0		97	151			
Queue Length 95th (ft)	78	54		#491	#500			
Internal Link Dist (ft)	204			448	244			
Turn Bay Length (ft)								
Base Capacity (vph)	722	751		639	567			
Starvation Cap Reductn	0	0		0	0			
Spillback Cap Reductn	0	0		0	0			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.10	0.25		0.83	0.81			

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 71.6
Natural Cycle: 110
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 28.6 Intersection LOS: C
Intersection Capacity Utilization 70.9% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Main Street & Florence Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	227	24	85	269	191	53	232	124	104	175	223
Future Volume (vph)	119	227	24	85	269	191	53	232	124	104	175	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	15	12	10	10	12	12	10	10	12	16	16
Storage Length (ft)	0		0	0		200	0		0	0		50
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.91	0.98		0.79	0.92			1.00	0.79		0.93	
Frt		0.986			0.938				0.850			0.850
Flt Protected	0.950			0.950				0.991			0.982	
Satd. Flow (prot)	1438	1859	0	1668	1477	0	0	1737	1492	0	2058	1812
Flt Permitted	0.950			0.568				0.738			0.525	
Satd. Flow (perm)	1310	1859	0	791	1477	0	0	1289	1172	0	1020	1812
Right Turn on Red			No			No			Yes			No
Satd. Flow (RTOR)									149			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		278			466			512			528	
Travel Time (s)		6.3			10.6			11.6			12.0	
Confl. Peds. (#/hr)	108		191	191		108	33		118	223		33
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.79	0.79	0.79	0.89	0.89	0.89	0.83	0.83	0.83	0.84	0.84	0.84
Heavy Vehicles (%)	13%	8%	17%	1%	5%	1%	2%	1%	1%	4%	2%	1%
Adj. Flow (vph)	151	287	30	96	302	215	64	280	149	124	208	265
Shared Lane Traffic (%)												
Lane Group Flow (vph)	151	317	0	96	517	0	0	344	149	0	332	265
Turn Type	Prot	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pt+ov
Protected Phases	5	2			6			8			4	4 5
Permitted Phases				6			8		8	4		
Detector Phase	5	2		6	6		8	8	8	4	4	5
Switch Phase												
Minimum Initial (s)	9.0	44.0		31.0	31.0		18.0	18.0	18.0	18.0	18.0	
Minimum Split (s)	14.0	49.0		36.0	36.0		36.0	36.0	36.0	36.0	36.0	
Total Split (s)	15.0	60.0		45.0	45.0		41.0	41.0	41.0	41.0	41.0	
Total Split (%)	14.9%	59.4%		44.6%	44.6%		40.6%	40.6%	40.6%	40.6%	40.6%	
Maximum Green (s)	10.0	55.0		40.0	40.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			6.0	6.0		6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None	None	None	None	
Walk Time (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Flash Dont Walk (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Pedestrian Calls (#/hr)				55	55		18	18	18	18	18	
Act Effct Green (s)	10.0	55.0		40.0	40.0			33.6	33.6		33.6	48.6
Actuated g/C Ratio	0.10	0.55		0.40	0.40			0.34	0.34		0.34	0.49
v/c Ratio	1.05	0.31		0.30	0.87			0.79	0.30		0.97	0.30
Control Delay	134.2	13.4		24.2	45.4			44.8	5.7		75.0	16.4
Queue Delay	0.0	3.9		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	134.2	17.3		24.2	45.4			44.8	5.7		75.0	16.4
LOS	F	B		C	D			D	A		E	B
Approach Delay		55.0			42.1			33.0			49.0	
Approach LOS		E			D			C			D	
Queue Length 50th (ft)	~108	106		42	304			196	0		205	97
Queue Length 95th (ft)	#194	137		83	#494			275	33		#340	139
Internal Link Dist (ft)		198			386			432			448	
Turn Bay Length (ft)												50
Base Capacity (vph)	144	1027		317	593			452	508		358	884
Starvation Cap Reductn	0	614		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	1.05	0.77		0.30	0.87			0.76	0.29		0.93	0.30

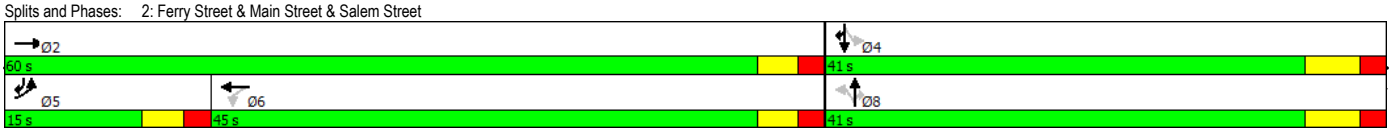
Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 99.6
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 44.7 Intersection LOS: D
Intersection Capacity Utilization 127.3% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Ferry Street & Main Street & Salem Street



Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR	Ø9
Lane Configurations								
Traffic Volume (vph)	0	0	93	345	4	429	149	
Future Volume (vph)	0	0	93	345	4	429	149	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00		0.99		
Frt						0.961		
Flt Protected				0.990				
Satd. Flow (prot)	0	0	0	3276	0	3323	0	
Flt Permitted				0.722		0.953		
Satd. Flow (perm)	0	0	0	2384	0	3167	0	
Right Turn on Red		Yes					Yes	
Satd. Flow (RTOR)						149		
Link Speed (mph)	30			30		30		
Link Distance (ft)	363			237		278		
Travel Time (s)	8.3			5.4		6.3		
Confl. Peds. (#/hr)			36				36	
Confl. Bikes (#/hr)							3	
Peak Hour Factor	0.25	0.25	0.80	0.80	0.97	0.97	0.97	
Heavy Vehicles (%)	0%	0%	2%	11%	0%	4%	1%	
Adj. Flow (vph)	0	0	116	431	4	442	154	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	0	547	0	600	0	
Turn Type			Perm	NA	Perm	NA		
Protected Phases				2		6		9
Permitted Phases			2		6			
Detector Phase			2	2	6	6		
Switch Phase								
Minimum Initial (s)			10.0	10.0	10.0	10.0		4.0
Minimum Split (s)			20.0	20.0	20.0	20.0		19.0
Total Split (s)			84.0	84.0	84.0	84.0		19.0
Total Split (%)			81.6%	81.6%	81.6%	81.6%		18%
Maximum Green (s)			80.0	80.0	80.0	80.0		17.0
Yellow Time (s)			3.0	3.0	3.0	3.0		2.0
All-Red Time (s)			1.0	1.0	1.0	1.0		0.0
Lost Time Adjust (s)				0.0		0.0		
Total Lost Time (s)				4.0		4.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0	3.0	3.0	3.0		3.0
Recall Mode			Max	Max	Max	Max		None
Walk Time (s)								11.0
Flash Dont Walk (s)								6.0
Pedestrian Calls (#/hr)								0
Act Effct Green (s)				99.0		99.0		
Actuated g/C Ratio				1.00		1.00		
v/c Ratio				0.23		0.19		
Control Delay				0.2		0.1		
Queue Delay				0.0		0.0		
Total Delay				0.2		0.1		
LOS				A		A		
Approach Delay				0.2		0.1		
Approach LOS				A		A		
Queue Length 50th (ft)				0		0		
Queue Length 95th (ft)				0		0		
Internal Link Dist (ft)	283			157		198		
Turn Bay Length (ft)								
Base Capacity (vph)				2384		3167		
Starvation Cap Reductn				0		0		
Spillback Cap Reductn				0		0		
Storage Cap Reductn				0		0		
Reduced v/c Ratio				0.23		0.19		

Intersection Summary			
Area Type:	Other		
Cycle Length: 103			
Actuated Cycle Length: 99			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.23			
Intersection Signal Delay: 0.2		Intersection LOS: A	
Intersection Capacity Utilization 36.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Main Street & Pleasant Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	39	4	48	0	0	0	0	407	23	12	418	0	
Future Volume (vph)	39	4	48	0	0	0	0	407	23	12	418	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	11	12	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor	0.96	0.92						1.00			1.00		
Frt		0.862						0.992					
Flt Protected	0.950										0.999		
Satd. Flow (prot)	1752	1700	0	0	0	0	0	3293	0	0	3356	0	
Flt Permitted	0.950										0.941		
Satd. Flow (perm)	1680	1700	0	0	0	0	0	3293	0	0	3160	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		58						8					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		234			280			219			237		
Travel Time (s)		5.3			6.4			5.0			5.4		
Confl. Peds. (#/hr)	26		51						24	24			
Peak Hour Factor	0.83	0.83	0.83	0.25	0.25	0.25	0.76	0.76	0.76	0.97	0.97	0.97	
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	9%	0%	0%	4%	0%	
Adj. Flow (vph)	47	5	58	0	0	0	0	536	30	12	431	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	47	63	0	0	0	0	0	566	0	0	443	0	
Turn Type	Perm	NA						NA		Perm	NA		
Protected Phases		4						2			6		9
Permitted Phases	4									6			
Detector Phase	4	4						2		6	6		
Switch Phase													
Minimum Initial (s)	8.0	8.0						10.0		10.0	10.0		4.0
Minimum Split (s)	12.0	12.0						14.0		14.0	14.0		20.0
Total Split (s)	24.0	24.0						62.0		62.0	62.0		20.0
Total Split (%)	22.6%	22.6%						58.5%		58.5%	58.5%		19%
Maximum Green (s)	20.0	20.0						58.0		58.0	58.0		18.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0						0.0			0.0		
Total Lost Time (s)	4.0	4.0						4.0			4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0		3.0
Recall Mode	None	None						Max		Max	Max		None
Walk Time (s)													4.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													0
Act Effct Green (s)	8.4	8.4						61.7			61.7		
Actuated g/C Ratio	0.11	0.11						0.82			0.82		
v/c Ratio	0.25	0.26						0.21			0.17		
Control Delay	33.7	13.2						2.2			2.1		
Queue Delay	0.0	0.0						0.6			0.4		
Total Delay	33.7	13.2						2.7			2.5		
LOS	C	B						A			A		
Approach Delay		22.0						2.7			2.5		
Approach LOS		C						A			A		
Queue Length 50th (ft)	20	2						24			18		
Queue Length 95th (ft)	46	30						33			32		
Internal Link Dist (ft)		154			200			139			157		
Turn Bay Length (ft)													
Base Capacity (vph)	448	495						2711			2600		
Starvation Cap Reductn	0	0						1679			1577		
Spillback Cap Reductn	0	0						0			0		
Storage Cap Reductn	0	0						0			0		
Reduced v/c Ratio	0.10	0.13						0.55			0.43		

Intersection Summary			
Area Type:	Other		
Cycle Length: 106			
Actuated Cycle Length: 75			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 4.5		Intersection LOS: A	
Intersection Capacity Utilization 33.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Main Street & Exchange Street/Irving Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø6
Lane Configurations													
Traffic Volume (vph)	89	370	50	329	605	52	110	282	139	30	313	96	
Future Volume (vph)	89	370	50	329	605	52	110	282	139	30	313	96	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	12	11	12	12	12	12	12	12	12	12	
Storage Length (ft)	215		0	300		0	0		0	0		75	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	1.00	0.99		0.99	1.00		0.98		0.96	0.99		0.96	
Frt		0.982			0.988				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1337	3263	0	1694	3483	0	1770	1792	1538	1736	1863	1468	
Flt Permitted	0.148			0.295			0.554			0.358			
Satd. Flow (perm)	207	3263	0	519	3483	0	1014	1792	1473	646	1863	1408	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)		12			8							78	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		255			718			281			219		
Travel Time (s)		5.8			16.3			6.4			5.0		
Confl. Peds. (#/hr)	12		13	13		12	27		30	30		27	
Confl. Bikes (#/hr)						1						3	
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90	0.76	0.76	0.76	0.91	0.91	0.91	
Heavy Vehicles (%)	26%	7%	15%	3%	2%	4%	2%	6%	5%	4%	2%	10%	
Adj. Flow (vph)	107	446	60	366	672	58	145	371	183	33	344	105	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	107	506	0	366	730	0	145	371	183	33	344	105	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	custom	NA	custom	
Protected Phases	7	4		3	8			2		1	1 6	1	6
Permitted Phases	4			8			2		2	6		6	
Detector Phase	7	4		3	8		2	2	2	1	6	1	
Switch Phase													
Minimum Initial (s)	4.0	10.0		4.0	10.0		8.0	8.0	8.0	4.0		4.0	8.0
Minimum Split (s)	9.0	27.0		9.0	27.0		39.0	39.0	39.0	10.0		10.0	39.0
Total Split (s)	15.0	35.0		15.0	35.0		40.0	40.0	40.0	24.0		24.0	64.0
Total Split (%)	13.2%	30.7%		13.2%	30.7%		35.1%	35.1%	35.1%	21.1%		21.1%	56%
Maximum Green (s)	10.0	30.0		10.0	30.0		34.0	34.0	34.0	18.0		18.0	58.0
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	None		None	Max
Walk Time (s)		5.0			5.0		5.0	5.0	5.0				5.0
Flash Dont Walk (s)		17.0			17.0		28.0	28.0	28.0				28.0
Pedestrian Calls (#/hr)		54			19		37	37	37				11
Act Effct Green (s)	36.5	27.1		37.6	27.6		45.0	45.0	45.0	58.1	58.1	58.1	
Actuated g/C Ratio	0.33	0.24		0.34	0.25		0.40	0.40	0.40	0.52	0.52	0.52	
v/c Ratio	0.66	0.63		1.30	0.84		0.35	0.51	0.31	0.08	0.35	0.14	
Control Delay	43.2	40.4		187.4	48.9		27.6	29.1	25.6	14.5	17.5	5.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	23.5	1.2	
Total Delay	43.2	40.4		187.4	48.9		27.6	29.1	25.6	14.5	41.0	6.7	
LOS	D	D		F	D		C	C	C	B	D	A	
Approach Delay		40.9			95.2			27.9			31.7		
Approach LOS		D			F			C			C		
Queue Length 50th (ft)	51	166		~233	260		74	203	91	12	147	10	
Queue Length 95th (ft)	84	202		#418	333		110	248	127	28	214	38	
Internal Link Dist (ft)		175			638			201			139		
Turn Bay Length (ft)	215			300								75	
Base Capacity (vph)	170	890		281	947		410	725	596	514	973	782	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	625	512	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Reduced v/c Ratio	0.63	0.57		1.30	0.77		0.35	0.51	0.31	0.06	0.99	0.39	

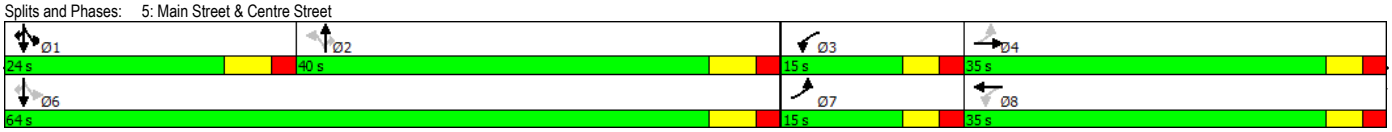
Intersection Summary

Area Type: Other
Cycle Length: 114
Actuated Cycle Length: 111.2
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.30
Intersection Signal Delay: 56.8 Intersection LOS: E
Intersection Capacity Utilization 81.6% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Main Street & Centre Street

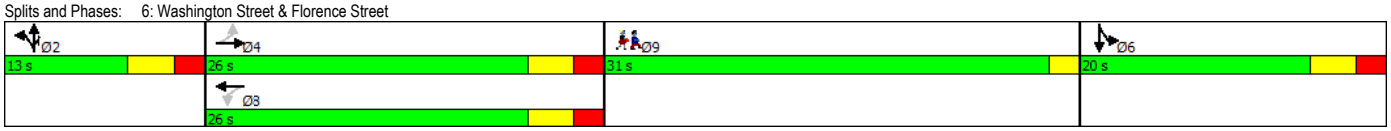


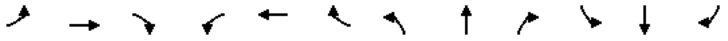
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	32	98	2	5	349	24	49	33	23	53	35	170	
Future Volume (vph)	32	98	2	5	349	24	49	33	23	53	35	170	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	100		0	0		100	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor											0.99		
Frt		0.998			0.990				0.850		0.911		
Flt Protected		0.988		0.950				0.971			0.990		
Satd. Flow (prot)	0	3284	0	1805	3445	0	0	1823	1553	0	1660	0	
Flt Permitted		0.801		0.652				0.971			0.990		
Satd. Flow (perm)	0	2663	0	1239	3445	0	0	1823	1553	0	1660	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		1			7				109		93		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		360			731			301			355		
Travel Time (s)		8.2			16.6			6.8			8.1		
Confl. Bikes (#/hr)												1	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.70	0.70	0.70	0.90	0.90	0.90	
Heavy Vehicles (%)	10%	8%	0%	0%	4%	0%	2%	0%	4%	8%	0%	1%	
Adj. Flow (vph)	38	117	2	6	415	29	70	47	33	59	39	189	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	157	0	6	444	0	0	117	33	0	287	0	
Turn Type	Perm	NA		Perm	NA		Split	NA	custom	Split	NA		
Protected Phases		4			8		2	2	2	6	6		9
Permitted Phases	4			8					2				
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		8.0	8.0	8.0	8.0	8.0		4.0
Minimum Split (s)	15.0	15.0		15.0	15.0		13.0	13.0	13.0	13.0	13.0		31.0
Total Split (s)	26.0	26.0		26.0	26.0		13.0	13.0	13.0	20.0	20.0		31.0
Total Split (%)	28.9%	28.9%		28.9%	28.9%		14.4%	14.4%	14.4%	22.2%	22.2%		34%
Maximum Green (s)	21.0	21.0		21.0	21.0		8.0	8.0	8.0	15.0	15.0		29.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		0.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0		5.0	5.0			5.0	5.0		5.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	Max	Max		Max	Max		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													22.0
Pedestrian Calls (#/hr)													97
Act Effct Green (s)		23.4		23.4	23.4			8.9	8.9		13.9		
Actuated g/C Ratio		0.29		0.29	0.29			0.11	0.11		0.17		
v/c Ratio		0.20		0.02	0.44			0.57	0.12		0.78		
Control Delay		28.8		27.0	29.5			53.1	0.9		41.0		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		28.8		27.0	29.5			53.1	0.9		41.0		
LOS		C		C	C			D	A		D		
Approach Delay		28.8			29.4			41.6			41.0		
Approach LOS		C			C			D			D		
Queue Length 50th (ft)		37		3	115			66	0		108		
Queue Length 95th (ft)		60		12	151			93	0		#240		
Internal Link Dist (ft)		280			651			221			275		
Turn Bay Length (ft)				100					100				
Base Capacity (vph)		782		364	1016			204	270		421		
Starvation Cap Reductn		0		0	0			0	0		0		
Spillback Cap Reductn		0		0	0			0	0		0		
Storage Cap Reductn		0		0	0			0	0		0		
Reduced v/c Ratio		0.20		0.02	0.44			0.57	0.12		0.68		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 79.7
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 34.2 — Intersection LOS: C
Intersection Capacity Utilization 53.1% — ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Washington Street & Florence Street

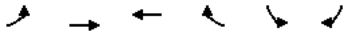




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	172	78	23	34	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	172	78	23	34	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.82	0.82	0.82	0.79	0.79	0.79	0.25	0.25	0.25
Hourly flow rate (vph)	0	0	0	0	210	95	29	43	0	0	0	0
Pedestrians		80									72	
Lane Width (ft)		0.0									0.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					363							
pX, platoon unblocked												
vC, conflicting volume	377			0			338	377	0	351	330	410
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	377			0			338	377	0	351	330	410
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			95	92	100	100	100	100
cM capacity (veh/h)	1193			1636			620	558	1091	572	593	646

Direction, Lane #	WB 1	NB 1
Volume Total	305	72
Volume Left	0	29
Volume Right	95	0
cSH	1700	581
Volume to Capacity	0.18	0.12
Queue Length 95th (ft)	0	11
Control Delay (s)	0.0	12.1
Lane LOS		B
Approach Delay (s)	0.0	12.1
Approach LOS		B

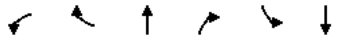
Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	25.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	158	357	49	65	21
Future Volume (Veh/h)	18	158	357	49	65	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.80	0.80	0.82	0.82
Hourly flow rate (vph)	19	165	446	61	79	26
Pedestrians		1	5		33	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	0		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		731	284			
pX, platoon unblocked						
vC, conflicting volume	540				635	288
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	540				635	288
tC, single (s)	4.1				6.9	7.1
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	98				79	96
cM capacity (veh/h)	1010				384	666

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	74	110	297	210	79	26
Volume Left	19	0	0	0	79	0
Volume Right	0	0	0	61	0	26
cSH	1010	1700	1700	1700	384	666
Volume to Capacity	0.02	0.06	0.17	0.12	0.21	0.04
Queue Length 95th (ft)	1	0	0	0	19	3
Control Delay (s)	2.3	0.0	0.0	0.0	16.8	10.6
Lane LOS	A				C	B
Approach Delay (s)	0.9		0.0		15.3	
Approach LOS					C	

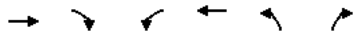
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	29.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	40	41	16	57	51
Future Volume (Veh/h)	10	40	41	16	57	51
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.76	0.76	0.85	0.85
Hourly flow rate (vph)	10	41	54	21	67	60
Pedestrians	11		17			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	286	78			86	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	78			86	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	98	96			95	
cM capacity (veh/h)	641	978			1484	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	51	75	127
Volume Left	10	0	67
Volume Right	41	21	0
cSH	887	1700	1484
Volume to Capacity	0.06	0.04	0.05
Queue Length 95th (ft)	5	0	4
Control Delay (s)	9.3	0.0	4.1
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	4.1
Approach LOS	A		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	230	106	66	375	52	37
Future Volume (Veh/h)	230	106	66	375	52	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.75	0.75
Hourly flow rate (vph)	258	119	74	421	69	49
Pedestrians				21	60	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				2	5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			437		946	398
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			437		946	398
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		73	92
cM capacity (veh/h)			1077		259	606

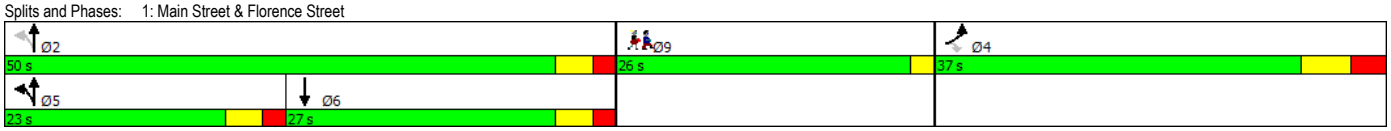
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	377	495	118
Volume Left	0	74	69
Volume Right	119	0	49
cSH	1700	1077	340
Volume to Capacity	0.22	0.07	0.35
Queue Length 95th (ft)	0	6	38
Control Delay (s)	0.0	2.0	21.1
Lane LOS		A	C
Approach Delay (s)	0.0	2.0	21.1
Approach LOS			C

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		63.0%	ICU Level of Service
Analysis Period (min)		15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2	Ø9
Lane Configurations								
Traffic Volume (vph)	120	227	200	293	314	76		
Future Volume (vph)	120	227	200	293	314	76		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	10	13	13	11		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor	0.95	0.96		0.99	0.98			
Frt		0.850			0.974			
Flt Protected	0.950			0.980				
Satd. Flow (prot)	1787	1599	0	1886	1847	0		
Flt Permitted	0.950			0.174				
Satd. Flow (perm)	1700	1529	0	333	1847	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)		267			10			
Link Speed (mph)	30			30	30			
Link Distance (ft)	284			528	324			
Travel Time (s)	6.5			12.0	7.4			
Confl. Peds. (#/hr)	26	13	34			34		
Peak Hour Factor	0.85	0.85	0.92	0.92	0.78	0.78		
Heavy Vehicles (%)	1%	1%	5%	0%	1%	3%		
Adj. Flow (vph)	141	267	217	318	403	97		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	141	267	0	535	500	0		
Turn Type	Prot	Perm	custom	NA	NA			
Protected Phases	4		5	2 5	6		2	9
Permitted Phases		4	2					
Detector Phase	4	4	5	2 5	6			
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0		4.0		16.0	4.0
Minimum Split (s)	15.0	15.0	13.0		9.0		21.0	26.0
Total Split (s)	37.0	37.0	23.0		27.0		50.0	26.0
Total Split (%)	32.7%	32.7%	20.4%		23.9%		44%	23%
Maximum Green (s)	30.0	30.0	18.0		22.0		45.0	24.0
Yellow Time (s)	4.0	4.0	3.0		3.0		3.0	2.0
All-Red Time (s)	3.0	3.0	2.0		2.0		2.0	0.0
Lost Time Adjust (s)	0.0	0.0			0.0			
Total Lost Time (s)	7.0	7.0			5.0			
Lead/Lag			Lead		Lag			
Lead-Lag Optimize?			Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0
Recall Mode	None	None	None		Max		Max	None
Walk Time (s)								6.0
Flash Dont Walk (s)								18.0
Pedestrian Calls (#/hr)								15
Act Effct Green (s)	12.1	12.1		46.3	22.6			
Actuated g/C Ratio	0.16	0.16		0.62	0.30			
v/c Ratio	0.49	0.57		0.90	0.88			
Control Delay	35.9	9.6		38.9	45.7			
Queue Delay	0.0	0.0		0.0	0.0			
Total Delay	35.9	9.6		38.9	45.7			
LOS	D	A		D	D			
Approach Delay	18.7			38.9	45.7			
Approach LOS	B			D	D			
Queue Length 50th (ft)	54	0		138	184			
Queue Length 95th (ft)	133	55		#590	#485			
Internal Link Dist (ft)	204			448	244			
Turn Bay Length (ft)								
Base Capacity (vph)	740	789		593	567			
Starvation Cap Reductn	0	0		0	0			
Spillback Cap Reductn	0	0		0	0			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.19	0.34		0.90	0.88			

Intersection Summary			
Area Type:	Other		
Cycle Length: 113			
Actuated Cycle Length: 74.5			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 35.6		Intersection LOS: D	
Intersection Capacity Utilization 69.0%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Main Street & Florence Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	373	23	60	215	108	35	247	121	91	245	190
Future Volume (vph)	169	373	23	60	215	108	35	247	121	91	245	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	15	12	10	10	12	12	10	10	12	16	16
Storage Length (ft)	0		0	0		200	0		0	0		50
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	1.00		0.95	0.95			1.00	0.97		1.00	
Frt		0.991			0.950				0.850			0.850
Flt Protected	0.950			0.950				0.994			0.987	
Satd. Flow (prot)	1547	1968	0	1620	1546	0	0	1711	1492	0	2110	1777
Flt Permitted	0.950			0.518				0.770			0.583	
Satd. Flow (perm)	1418	1968	0	835	1546	0	0	1324	1443	0	1244	1777
Right Turn on Red			No			No			Yes			No
Satd. Flow (RTOR)									133			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		278			466			512			528	
Travel Time (s)		6.3			10.6			11.6			12.0	
Confl. Peds. (#/hr)	81		58	58		81	20		8	8		20
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.94	0.94
Heavy Vehicles (%)	5%	4%	18%	4%	5%	0%	3%	3%	1%	0%	1%	3%
Adj. Flow (vph)	178	393	24	66	236	119	38	271	133	97	261	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	178	417	0	66	355	0	0	309	133	0	358	202
Turn Type	Prot	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pt+ov
Protected Phases	5	2			6			8			4	4 5
Permitted Phases				6			8		8	4		
Detector Phase	5	2		6	6		8	8	8	4	4	5
Switch Phase												
Minimum Initial (s)	9.0	44.0		31.0	31.0		18.0	18.0	18.0	18.0	18.0	
Minimum Split (s)	14.0	49.0		36.0	36.0		36.0	36.0	36.0	36.0	36.0	
Total Split (s)	15.0	60.0		45.0	45.0		41.0	41.0	41.0	41.0	41.0	
Total Split (%)	14.9%	59.4%		44.6%	44.6%		40.6%	40.6%	40.6%	40.6%	40.6%	
Maximum Green (s)	10.0	55.0		40.0	40.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			6.0	6.0		6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None	None	None	None	
Walk Time (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Flash Dont Walk (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Pedestrian Calls (#/hr)				55	55		18	18	18	18	18	
Act Effct Green (s)	10.0	55.2		40.2	40.2			28.1	28.1		28.1	43.2
Actuated g/C Ratio	0.11	0.58		0.43	0.43			0.30	0.30		0.30	0.46
v/c Ratio	1.09	0.36		0.19	0.54			0.78	0.25		0.97	0.25
Control Delay	137.9	12.5		20.9	25.4			45.0	5.5		72.6	16.2
Queue Delay	0.0	4.8		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	137.9	17.3		20.9	25.4			45.0	5.5		72.6	16.2
LOS	F	B		C	C			D	A		E	B
Approach Delay		53.4			24.7			33.1			52.2	
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	~123	127		25	158			168	0		210	71
Queue Length 95th (ft)	#272	216		59	271			269	39		#370	116
Internal Link Dist (ft)		198			386			432			448	
Turn Bay Length (ft)												50
Base Capacity (vph)	164	1151		355	658			493	620		463	812
Starvation Cap Reductn	0	651		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	1.09	0.83		0.19	0.54			0.63	0.21		0.77	0.25

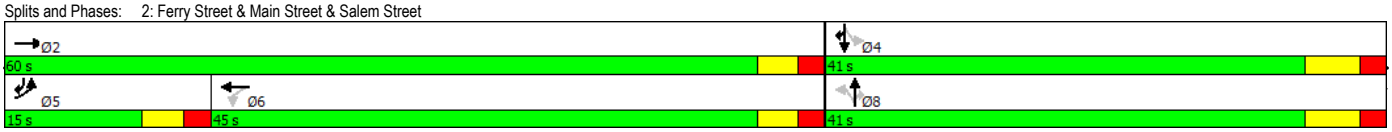
Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 94.4
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 42.6 Intersection LOS: D
Intersection Capacity Utilization 119.5% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Ferry Street & Main Street & Salem Street



Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR	Ø9
Lane Configurations								
Traffic Volume (vph)	0	0	121	559	10	319	117	
Future Volume (vph)	0	0	121	559	10	319	117	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00		0.99		
Frt						0.961		
Flt Protected				0.991		0.999		
Satd. Flow (prot)	0	0	0	3425	0	3286	0	
Flt Permitted				0.764		0.939		
Satd. Flow (perm)	0	0	0	2633	0	3089	0	
Right Turn on Red		Yes					Yes	
Satd. Flow (RTOR)						129		
Link Speed (mph)	30			30		30		
Link Distance (ft)	363			237		278		
Travel Time (s)	8.3			5.4		6.3		
Confl. Peds. (#/hr)			46				46	
Confl. Bikes (#/hr)							1	
Peak Hour Factor	0.25	0.25	0.95	0.95	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	0%	2%	5%	0%	5%	2%	
Adj. Flow (vph)	0	0	127	588	11	351	129	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	0	715	0	491	0	
Turn Type			Perm	NA	Perm	NA		
Protected Phases				2		6		9
Permitted Phases			2		6			
Detector Phase			2	2	6	6		
Switch Phase								
Minimum Initial (s)			10.0	10.0	10.0	10.0		4.0
Minimum Split (s)			20.0	20.0	20.0	20.0		19.0
Total Split (s)			84.0	84.0	84.0	84.0		19.0
Total Split (%)			81.6%	81.6%	81.6%	81.6%		18%
Maximum Green (s)			80.0	80.0	80.0	80.0		17.0
Yellow Time (s)			3.0	3.0	3.0	3.0		2.0
All-Red Time (s)			1.0	1.0	1.0	1.0		0.0
Lost Time Adjust (s)				0.0		0.0		
Total Lost Time (s)				4.0		4.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0	3.0	3.0	3.0		3.0
Recall Mode			Max	Max	Max	Max		None
Walk Time (s)								11.0
Flash Dont Walk (s)								6.0
Pedestrian Calls (#/hr)								0
Act Effct Green (s)				99.0		99.0		
Actuated g/C Ratio				1.00		1.00		
v/c Ratio				0.27		0.16		
Control Delay				0.3		0.1		
Queue Delay				0.0		0.0		
Total Delay				0.3		0.1		
LOS				A		A		
Approach Delay				0.3		0.1		
Approach LOS				A		A		
Queue Length 50th (ft)				0		0		
Queue Length 95th (ft)				0		0		
Internal Link Dist (ft)	283			157		198		
Turn Bay Length (ft)								
Base Capacity (vph)				2633		3089		
Starvation Cap Reductn				0		0		
Spillback Cap Reductn				0		0		
Storage Cap Reductn				0		0		
Reduced v/c Ratio				0.27		0.16		

Intersection Summary			
Area Type:	Other		
Cycle Length: 103			
Actuated Cycle Length: 99			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 0.2		Intersection LOS: A	
Intersection Capacity Utilization 39.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Main Street & Pleasant Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	128	4	120	0	0	0	0	548	19	5	319	0	
Future Volume (vph)	128	4	120	0	0	0	0	548	19	5	319	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	11	12	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor	0.95	0.92						1.00			1.00		
Frt		0.854						0.995					
Flt Protected	0.950										0.999		
Satd. Flow (prot)	1805	1648	0	0	0	0	0	3421	0	0	3354	0	
Flt Permitted	0.950										0.949		
Satd. Flow (perm)	1716	1648	0	0	0	0	0	3421	0	0	3186	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		133						5					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		234			280			219			237		
Travel Time (s)		5.3			6.4			5.0			5.4		
Confl. Peds. (#/hr)	31		45						29	29			
Confl. Bikes (#/hr)									3				
Peak Hour Factor	0.90	0.90	0.90	0.25	0.25	0.25	0.90	0.90	0.90	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	25%	2%	0%	0%	0%	0%	5%	0%	0%	4%	0%	
Adj. Flow (vph)	142	4	133	0	0	0	0	609	21	5	343	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	142	137	0	0	0	0	0	630	0	0	348	0	
Turn Type	Perm	NA						NA		Perm	NA		
Protected Phases		4						2			6		9
Permitted Phases	4									6			
Detector Phase	4	4						2		6	6		
Switch Phase													
Minimum Initial (s)	8.0	8.0						10.0		10.0	10.0		4.0
Minimum Split (s)	12.0	12.0						14.0		14.0	14.0		20.0
Total Split (s)	24.0	24.0						62.0		62.0	62.0		20.0
Total Split (%)	22.6%	22.6%						58.5%		58.5%	58.5%		19%
Maximum Green (s)	20.0	20.0						58.0		58.0	58.0		18.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0						0.0			0.0		
Total Lost Time (s)	4.0	4.0						4.0			4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0		3.0
Recall Mode	None	None						Max		Max	Max		None
Walk Time (s)													4.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													0
Act Effct Green (s)	11.7	11.7						58.1			58.1		
Actuated g/C Ratio	0.15	0.15						0.75			0.75		
v/c Ratio	0.55	0.38						0.25			0.15		
Control Delay	38.8	9.4						3.6			3.3		
Queue Delay	0.0	0.0						1.2			0.5		
Total Delay	38.8	9.4						4.8			3.7		
LOS	D	A						A			A		
Approach Delay		24.4						4.8			3.7		
Approach LOS		C						A			A		
Queue Length 50th (ft)	65	2						37			19		
Queue Length 95th (ft)	119	47						70			38		
Internal Link Dist (ft)		154			200			139			157		
Turn Bay Length (ft)													
Base Capacity (vph)	441	522						2554			2377		
Starvation Cap Reductn	0	0						1636			1565		
Spillback Cap Reductn	0	0						0			0		
Storage Cap Reductn	0	0						0			0		
Reduced v/c Ratio	0.32	0.26						0.69			0.43		

Intersection Summary

Area Type: Other
Cycle Length: 106
Actuated Cycle Length: 77.8
Natural Cycle: 50
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 8.8 Intersection LOS: A
Intersection Capacity Utilization 33.7% ICU Level of Service A
Analysis Period (min) 15

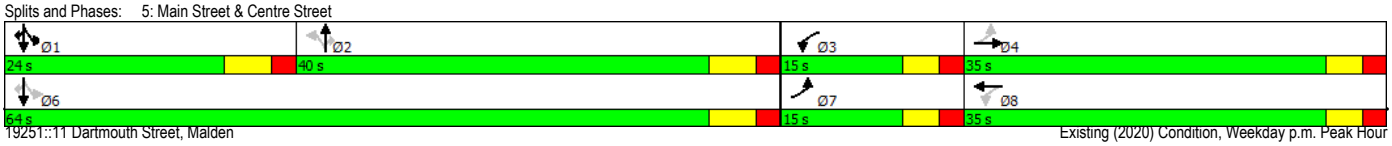
Splits and Phases: 4: Main Street & Exchange Street/Irving Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø6
Lane Configurations													
Traffic Volume (vph)	191	665	56	189	331	48	69	342	296	40	292	88	
Future Volume (vph)	191	665	56	189	331	48	69	342	296	40	292	88	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	12	11	12	12	12	12	12	12	12	12	
Storage Length (ft)	215		0	300		0	0		0	0		75	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.99	0.99		0.98	1.00		0.96		0.97	0.99		0.93	
Frt		0.988			0.981				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1560	3468	0	1711	3498	0	1719	1845	1568	1805	1845	1455	
Flt Permitted	0.401			0.142			0.568			0.359			
Satd. Flow (perm)	653	3468	0	251	3498	0	991	1845	1517	677	1845	1357	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)		7			14							78	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		385			718			281			219		
Travel Time (s)		8.8			16.3			6.4			5.0		
Confl. Peds. (#/hr)	11		37	37		11	54		19	19		54	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.96	0.96	0.96	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	8%	1%	13%	2%	1%	0%	5%	3%	3%	0%	3%	11%	
Adj. Flow (vph)	199	693	58	201	352	51	74	368	318	43	317	96	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	199	751	0	201	403	0	74	368	318	43	317	96	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	custom	NA	custom	
Protected Phases	7	4		3	8			2		1	1 6	1	6
Permitted Phases	4			8			2		2	6		6	
Detector Phase	7	4		3	8		2	2	2	1	6	1	
Switch Phase													
Minimum Initial (s)	4.0	10.0		4.0	10.0		8.0	8.0	8.0	4.0		4.0	8.0
Minimum Split (s)	9.0	27.0		9.0	27.0		39.0	39.0	39.0	10.0		10.0	39.0
Total Split (s)	15.0	35.0		15.0	35.0		40.0	40.0	40.0	24.0		24.0	64.0
Total Split (%)	13.2%	30.7%		13.2%	30.7%		35.1%	35.1%	35.1%	21.1%		21.1%	56%
Maximum Green (s)	10.0	30.0		10.0	30.0		34.0	34.0	34.0	18.0		18.0	58.0
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	None		None	Max
Walk Time (s)		5.0			5.0		5.0	5.0	5.0				5.0
Flash Dont Walk (s)		17.0			17.0		28.0	28.0	28.0				28.0
Pedestrian Calls (#/hr)		54			19		37	37	37				11
Act Effct Green (s)	38.2	28.2		38.2	28.2		45.0	45.0	45.0	58.1	58.1	58.1	
Actuated g/C Ratio	0.34	0.25		0.34	0.25		0.40	0.40	0.40	0.52	0.52	0.52	
v/c Ratio	0.66	0.86		0.93	0.45		0.19	0.50	0.52	0.10	0.33	0.13	
Control Delay	37.1	50.5		74.7	35.9		24.6	28.8	30.1	14.7	17.4	5.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	21.7	1.1	
Total Delay	37.1	50.5		74.7	35.9		24.6	28.8	30.1	14.7	39.2	6.1	
LOS	D	D		E	D		C	C	C	B	D	A	
Approach Delay		47.7			48.8			29.0			29.9		
Approach LOS		D			D			C			C		
Queue Length 50th (ft)	100	271		100	124		35	200	175	15	133	6	
Queue Length 95th (ft)	160	345		#242	173		73	303	277	34	197	33	
Internal Link Dist (ft)		305			638			201			139		
Turn Bay Length (ft)	215			300								75	
Base Capacity (vph)	303	932		215	945		397	739	608	530	953	755	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	628	495	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Reduced v/c Ratio	0.66	0.81		0.93	0.43		0.19	0.50	0.52	0.08	0.98	0.37	

Intersection Summary

Area Type: Other
Cycle Length: 114
Actuated Cycle Length: 112.3
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 39.9 Intersection LOS: D
Intersection Capacity Utilization 80.1% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Main Street & Centre Street

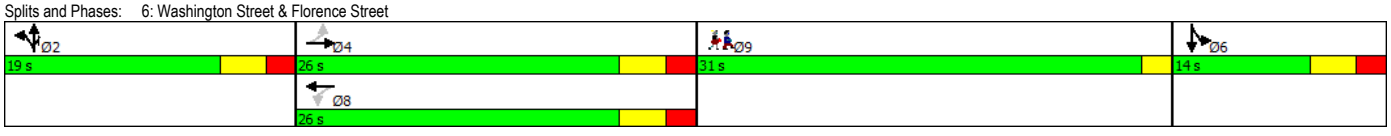


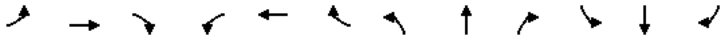
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	63	202	3	1	192	28	35	44	40	52	8	57	
Future Volume (vph)	63	202	3	1	192	28	35	44	40	52	8	57	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	100		0	0		100	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor									0.99				
Frt		0.998			0.981				0.850		0.935		
Flt Protected		0.988		0.950				0.978			0.978		
Satd. Flow (prot)	0	3444	0	1805	3393	0	0	1838	1568	0	1737	0	
Flt Permitted		0.821		0.577				0.978			0.978		
Satd. Flow (perm)	0	2862	0	1096	3393	0	0	1838	1547	0	1737	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		1			17				109		42		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		360			731			301			355		
Travel Time (s)		8.2			16.6			6.8			8.1		
Confl. Bikes (#/hr)									1				
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.88	0.88	0.88	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	4%	33%	0%	5%	0%	0%	2%	3%	0%	0%	0%	
Adj. Flow (vph)	67	215	3	1	221	32	40	50	45	56	9	61	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	285	0	1	253	0	0	90	45	0	126	0	
Turn Type	Perm	NA		Perm	NA		Split	NA	custom	Split	NA		
Protected Phases		4			8		2	2	2	6	6		9
Permitted Phases	4			8					2				
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		8.0	8.0	8.0	8.0	8.0		4.0
Minimum Split (s)	15.0	15.0		15.0	15.0		13.0	13.0	13.0	13.0	13.0		31.0
Total Split (s)	26.0	26.0		26.0	26.0		19.0	19.0	19.0	14.0	14.0		31.0
Total Split (%)	28.9%	28.9%		28.9%	28.9%		21.1%	21.1%	21.1%	15.6%	15.6%		34%
Maximum Green (s)	21.0	21.0		21.0	21.0		14.0	14.0	14.0	9.0	9.0		29.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		0.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0		5.0	5.0			5.0	5.0		5.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	Max	Max		Max	Max		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													22.0
Pedestrian Calls (#/hr)													100
Act Effct Green (s)		30.5		30.5	30.5			10.5	10.5		9.3		
Actuated g/C Ratio		0.40		0.40	0.40			0.14	0.14		0.12		
v/c Ratio		0.25		0.00	0.19			0.36	0.15		0.51		
Control Delay		27.0		26.0	24.6			39.5	1.0		34.9		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		27.0		26.0	24.6			39.5	1.0		34.9		
LOS		C		C	C			D	A		C		
Approach Delay		27.0			24.6			26.7			34.9		
Approach LOS		C			C			C			C		
Queue Length 50th (ft)		67		0	54			46	0		43		
Queue Length 95th (ft)		110		4	88			89	0		#110		
Internal Link Dist (ft)		280			651			221			275		
Turn Bay Length (ft)				100					100				
Base Capacity (vph)		1131		433	1350			364	398		258		
Starvation Cap Reductn		0		0	0			0	0		0		
Spillback Cap Reductn		0		0	0			0	0		0		
Storage Cap Reductn		0		0	0			0	0		0		
Reduced v/c Ratio		0.25		0.00	0.19			0.25	0.11		0.49		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 77.2
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 27.4 — Intersection LOS: C
Intersection Capacity Utilization 42.6% — ICU Level of Service A
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Washington Street & Florence Street

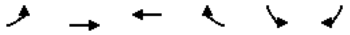




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	156	81	55	59	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	156	81	55	59	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.91	0.91	0.91	0.87	0.87	0.87	0.25	0.25	0.25
Hourly flow rate (vph)	0	0	0	0	171	89	63	68	0	0	0	0
Pedestrians		109									98	
Lane Width (ft)		0.0									0.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					363							
pX, platoon unblocked												
vC, conflicting volume	358			0			324	358	0	348	314	422
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	358			0			324	358	0	348	314	422
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			90	88	100	100	100	100
cM capacity (veh/h)	1212			1636			632	568	1091	555	605	636

Direction, Lane #	WB 1	NB 1
Volume Total	260	131
Volume Left	0	63
Volume Right	89	0
cSH	1700	597
Volume to Capacity	0.15	0.22
Queue Length 95th (ft)	0	21
Control Delay (s)	0.0	12.7
Lane LOS		B
Approach Delay (s)	0.0	12.7
Approach LOS		B

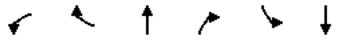
Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	28.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	258	185	51	101	38
Future Volume (Veh/h)	23	258	185	51	101	38
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	25	284	213	59	116	44
Pedestrians		2	11		37	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	1		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		731	284			
pX, platoon unblocked						
vC, conflicting volume	309				482	175
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	309				482	175
tC, single (s)	4.2				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				76	95
cM capacity (veh/h)	1196				487	817

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	120	189	142	130	116	44
Volume Left	25	0	0	0	116	0
Volume Right	0	0	0	59	0	44
cSH	1196	1700	1700	1700	487	817
Volume to Capacity	0.02	0.11	0.08	0.08	0.24	0.05
Queue Length 95th (ft)	2	0	0	0	23	4
Control Delay (s)	1.8	0.0	0.0	0.0	14.7	9.7
Lane LOS	A				B	A
Approach Delay (s)	0.7		0.0		13.3	
Approach LOS					B	

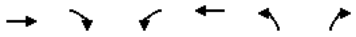
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	59	79	43	54	35
Future Volume (Veh/h)	4	59	79	43	54	35
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	4	66	92	50	68	44
Pedestrians	13		2			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	312	134			155	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	312	134			155	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	93			95	
cM capacity (veh/h)	644	902			1422	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	142	112
Volume Left	4	0	68
Volume Right	66	50	0
cSH	882	1700	1422
Volume to Capacity	0.08	0.08	0.05
Queue Length 95th (ft)	6	0	4
Control Delay (s)	9.4	0.0	4.8
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	4.8
Approach LOS	A		

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		29.6%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	270	78	56	188	92	89
Future Volume (Veh/h)	270	78	56	188	92	89
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	310	90	63	211	116	113
Pedestrians	1			16	62	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			1	5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			462		755	433
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			462		755	433
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			94		65	80
cM capacity (veh/h)			1023		335	577

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	400	274	229
Volume Left	0	63	116
Volume Right	90	0	113
cSH	1700	1023	422
Volume to Capacity	0.24	0.06	0.54
Queue Length 95th (ft)	0	5	79
Control Delay (s)	0.0	2.5	23.2
Lane LOS		A	C
Approach Delay (s)	0.0	2.5	23.2
Approach LOS			C

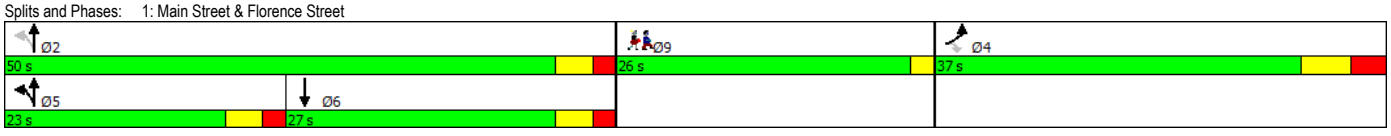
Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2	Ø9
Lane Configurations								
Traffic Volume (vph)	63	166	238	254	295	153		
Future Volume (vph)	63	166	238	254	295	153		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	10	13	13	11		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor	0.96	0.96		1.00	0.98			
Frt		0.850			0.954			
Flt Protected	0.950			0.976				
Satd. Flow (prot)	1687	1568	0	1825	1780	0		
Flt Permitted	0.950			0.212				
Satd. Flow (perm)	1617	1508	0	396	1780	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)		191			21			
Link Speed (mph)	30			30	30			
Link Distance (ft)	284			528	324			
Travel Time (s)	6.5			12.0	7.4			
Confl. Peds. (#/hr)	22	10	17			17		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.87	0.87	0.89	0.89	0.94	0.94		
Heavy Vehicles (%)	7%	3%	5%	5%	5%	1%		
Adj. Flow (vph)	72	191	267	285	314	163		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	72	191	0	552	477	0		
Turn Type	Prot	Perm	custom	NA	NA			
Protected Phases	4		5	2 5	6		2	9
Permitted Phases		4	2					
Detector Phase	4	4	5	2 5	6			
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0		4.0		16.0	4.0
Minimum Split (s)	15.0	15.0	13.0		9.0		21.0	26.0
Total Split (s)	37.0	37.0	23.0		27.0		50.0	26.0
Total Split (%)	32.7%	32.7%	20.4%		23.9%		44%	23%
Maximum Green (s)	30.0	30.0	18.0		22.0		45.0	24.0
Yellow Time (s)	4.0	4.0	3.0		3.0		3.0	2.0
All-Red Time (s)	3.0	3.0	2.0		2.0		2.0	0.0
Lost Time Adjust (s)	0.0	0.0			0.0			
Total Lost Time (s)	7.0	7.0			5.0			
Lead/Lag			Lead		Lag			
Lead-Lag Optimize?			Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0
Recall Mode	None	None	None		Max		Max	None
Walk Time (s)								6.0
Flash Dont Walk (s)								18.0
Pedestrian Calls (#/hr)								15
Act Effct Green (s)	9.5	9.5		46.0	22.5			
Actuated g/C Ratio	0.13	0.13		0.64	0.31			
v/c Ratio	0.32	0.52		0.89	0.83			
Control Delay	34.8	11.3		33.8	38.8			
Queue Delay	0.0	0.0		0.0	0.0			
Total Delay	34.8	11.3		33.8	38.8			
LOS	C	B		C	D			
Approach Delay	17.7			33.8	38.8			
Approach LOS	B			C	D			
Queue Length 50th (ft)	27	0		120	159			
Queue Length 95th (ft)	80	55		#538	#524			
Internal Link Dist (ft)	204			448	244			
Turn Bay Length (ft)								
Base Capacity (vph)	722	754		621	573			
Starvation Cap Reductn	0	0		0	0			
Spillback Cap Reductn	0	0		0	0			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.10	0.25		0.89	0.83			

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 71.7
Natural Cycle: 110
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 32.4 Intersection LOS: C
Intersection Capacity Utilization 72.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Main Street & Florence Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	235	25	88	280	198	55	241	132	108	181	232
Future Volume (vph)	123	235	25	88	280	198	55	241	132	108	181	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	15	12	10	10	12	12	10	10	12	16	16
Storage Length (ft)	0		0	0		200	0		0	0		50
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.91	0.98		0.80	0.92			1.00	0.79		0.96	
Frt		0.985			0.938				0.850			0.850
Flt Protected	0.950			0.950				0.991			0.982	
Satd. Flow (prot)	1438	1856	0	1668	1477	0	0	1737	1492	0	2058	1812
Flt Permitted	0.950			0.562				0.719			0.511	
Satd. Flow (perm)	1314	1856	0	786	1477	0	0	1256	1172	0	1031	1812
Right Turn on Red			No			No			Yes			No
Satd. Flow (RTOR)									159			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		278			466			512			528	
Travel Time (s)		6.3			10.6			11.6			12.0	
Confl. Peds. (#/hr)	108		191	191		108	33		118	118		33
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.79	0.79	0.79	0.89	0.89	0.89	0.83	0.83	0.83	0.84	0.84	0.84
Heavy Vehicles (%)	13%	8%	17%	1%	5%	1%	2%	1%	1%	4%	2%	1%
Adj. Flow (vph)	156	297	32	99	315	222	66	290	159	129	215	276
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	329	0	99	537	0	0	356	159	0	344	276
Turn Type	Prot	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pt+ov
Protected Phases	5	2			6			8			4	4 5
Permitted Phases				6			8		8	4		
Detector Phase	5	2		6	6		8	8	8	4	4	5
Switch Phase												
Minimum Initial (s)	9.0	44.0		31.0	31.0		18.0	18.0	18.0	18.0	18.0	
Minimum Split (s)	14.0	49.0		36.0	36.0		36.0	36.0	36.0	36.0	36.0	
Total Split (s)	15.0	60.0		45.0	45.0		41.0	41.0	41.0	41.0	41.0	
Total Split (%)	14.9%	59.4%		44.6%	44.6%		40.6%	40.6%	40.6%	40.6%	40.6%	
Maximum Green (s)	10.0	55.0		40.0	40.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			6.0	6.0		6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None	None	None	None	
Walk Time (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Flash Dont Walk (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Pedestrian Calls (#/hr)				55	55		18	18	18	18	18	
Act Effct Green (s)	10.0	55.0		40.0	40.0			34.3	34.3		34.3	49.3
Actuated g/C Ratio	0.10	0.55		0.40	0.40			0.34	0.34		0.34	0.49
v/c Ratio	1.09	0.32		0.32	0.91			0.83	0.31		0.98	0.31
Control Delay	145.9	13.7		24.6	51.0			48.5	5.7		77.0	16.5
Queue Delay	0.0	4.7		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	145.9	18.4		24.6	51.0			48.5	5.7		77.0	16.5
LOS	F	B		C	D			D	A		E	B
Approach Delay		59.4			46.9			35.3			50.1	
Approach LOS		E			D			D			D	
Queue Length 50th (ft)	~114	111		43	322			207	0		215	102
Queue Length 95th (ft)	#201	142		86	#524			#312	34		#355	145
Internal Link Dist (ft)		198			386			432			448	
Turn Bay Length (ft)												50
Base Capacity (vph)	143	1018		313	588			438	513		360	890
Starvation Cap Reductn	0	607		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	1.09	0.80		0.32	0.91			0.81	0.31		0.96	0.31

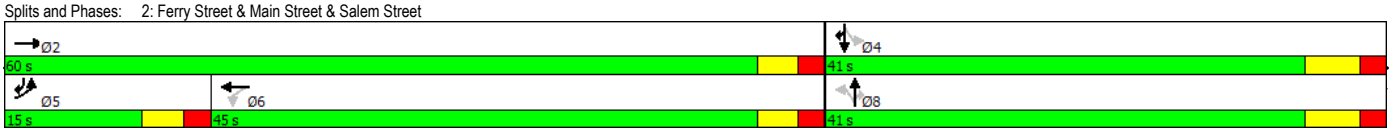
Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 100.3
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 47.8 Intersection LOS: D
Intersection Capacity Utilization 127.5% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Ferry Street & Main Street & Salem Street



Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR	Ø9
Lane Configurations								
Traffic Volume (vph)	0	0	99	362	4	444	156	
Future Volume (vph)	0	0	99	362	4	444	156	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00		0.99		
Frt						0.961		
Flt Protected				0.989				
Satd. Flow (prot)	0	0	0	3274	0	3323	0	
Flt Permitted				0.710		0.953		
Satd. Flow (perm)	0	0	0	2345	0	3167	0	
Right Turn on Red		Yes					Yes	
Satd. Flow (RTOR)						151		
Link Speed (mph)	30			30		30		
Link Distance (ft)	363			237		278		
Travel Time (s)	8.3			5.4		6.3		
Confl. Peds. (#/hr)			36				36	
Confl. Bikes (#/hr)							3	
Peak Hour Factor	0.25	0.25	0.80	0.80	0.97	0.97	0.97	
Heavy Vehicles (%)	0%	0%	2%	11%	0%	4%	1%	
Adj. Flow (vph)	0	0	124	453	4	458	161	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	0	577	0	623	0	
Turn Type			Perm	NA	Perm	NA		
Protected Phases				2		6		9
Permitted Phases			2		6			
Detector Phase			2	2	6	6		
Switch Phase								
Minimum Initial (s)			10.0	10.0	10.0	10.0		4.0
Minimum Split (s)			20.0	20.0	20.0	20.0		19.0
Total Split (s)			84.0	84.0	84.0	84.0		19.0
Total Split (%)			81.6%	81.6%	81.6%	81.6%		18%
Maximum Green (s)			80.0	80.0	80.0	80.0		17.0
Yellow Time (s)			3.0	3.0	3.0	3.0		2.0
All-Red Time (s)			1.0	1.0	1.0	1.0		0.0
Lost Time Adjust (s)				0.0		0.0		
Total Lost Time (s)				4.0		4.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0	3.0	3.0	3.0		3.0
Recall Mode			Max	Max	Max	Max		None
Walk Time (s)								11.0
Flash Dont Walk (s)								6.0
Pedestrian Calls (#/hr)								0
Act Effct Green (s)				99.0		99.0		
Actuated g/C Ratio				1.00		1.00		
v/c Ratio				0.25		0.20		
Control Delay				0.3		0.1		
Queue Delay				0.0		0.0		
Total Delay				0.3		0.1		
LOS				A		A		
Approach Delay				0.3		0.1		
Approach LOS				A		A		
Queue Length 50th (ft)				0		0		
Queue Length 95th (ft)				0		0		
Internal Link Dist (ft)	283			157		198		
Turn Bay Length (ft)								
Base Capacity (vph)				2345		3167		
Starvation Cap Reductn				0		0		
Spillback Cap Reductn				0		0		
Storage Cap Reductn				0		0		
Reduced v/c Ratio				0.25		0.20		

Intersection Summary			
Area Type:	Other		
Cycle Length: 103			
Actuated Cycle Length: 99			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.25			
Intersection Signal Delay: 0.2		Intersection LOS: A	
Intersection Capacity Utilization 37.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Main Street & Pleasant Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	45	4	54	0	0	0	0	424	24	12	433	0	
Future Volume (vph)	45	4	54	0	0	0	0	424	24	12	433	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	11	12	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor	0.96	0.92						1.00			1.00		
Frt		0.861						0.992					
Flt Protected	0.950										0.999		
Satd. Flow (prot)	1752	1697	0	0	0	0	0	3293	0	0	3355	0	
Flt Permitted	0.950										0.941		
Satd. Flow (perm)	1680	1697	0	0	0	0	0	3293	0	0	3160	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		65						9					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		234			280			219			237		
Travel Time (s)		5.3			6.4			5.0			5.4		
Confl. Peds. (#/hr)	26		51						24	24			
Peak Hour Factor	0.83	0.83	0.83	0.25	0.25	0.25	0.76	0.76	0.76	0.97	0.97	0.97	
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	9%	0%	0%	4%	0%	
Adj. Flow (vph)	54	5	65	0	0	0	0	558	32	12	446	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	54	70	0	0	0	0	0	590	0	0	458	0	
Turn Type	Perm	NA						NA		Perm	NA		
Protected Phases		4						2			6		9
Permitted Phases	4									6			
Detector Phase	4	4						2		6	6		
Switch Phase													
Minimum Initial (s)	8.0	8.0						10.0		10.0	10.0		4.0
Minimum Split (s)	12.0	12.0						14.0		14.0	14.0		20.0
Total Split (s)	24.0	24.0						62.0		62.0	62.0		20.0
Total Split (%)	22.6%	22.6%						58.5%		58.5%	58.5%		19%
Maximum Green (s)	20.0	20.0						58.0		58.0	58.0		18.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0						0.0			0.0		
Total Lost Time (s)	4.0	4.0						4.0			4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0		3.0
Recall Mode	None	None						Max		Max	Max		None
Walk Time (s)													4.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													0
Act Effct Green (s)	8.6	8.6						61.7			61.7		
Actuated g/C Ratio	0.11	0.11						0.82			0.82		
v/c Ratio	0.28	0.28						0.22			0.18		
Control Delay	34.2	12.8						2.2			2.2		
Queue Delay	0.0	0.0						0.6			0.4		
Total Delay	34.2	12.8						2.9			2.5		
LOS	C	B						A			A		
Approach Delay		22.2						2.9			2.5		
Approach LOS		C						A			A		
Queue Length 50th (ft)	23	2						25			19		
Queue Length 95th (ft)	51	31						35			35		
Internal Link Dist (ft)		154			200			139			157		
Turn Bay Length (ft)													
Base Capacity (vph)	447	499						2705			2594		
Starvation Cap Reductn	0	0						1659			1565		
Spillback Cap Reductn	0	0						0			0		
Storage Cap Reductn	0	0						0			0		
Reduced v/c Ratio	0.12	0.14						0.56			0.45		

Intersection Summary			
Area Type:	Other		
Cycle Length: 106			
Actuated Cycle Length: 75.2			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 4.8		Intersection LOS: A	
Intersection Capacity Utilization 34.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Main Street & Exchange Street/Irving Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø6
Lane Configurations													
Traffic Volume (vph)	92	390	53	341	638	57	115	293	144	34	325	99	
Future Volume (vph)	92	390	53	341	638	57	115	293	144	34	325	99	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	12	11	12	12	12	12	12	12	12	12	
Storage Length (ft)	215		0	300		0	0		0	0		125	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	1.00	0.99		0.99	1.00		0.98		0.96	0.99		0.96	
Frt		0.982			0.988				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1337	3263	0	1694	3482	0	1770	1792	1538	1736	1863	1468	
Flt Permitted	0.143			0.278			0.548			0.344			
Satd. Flow (perm)	201	3263	0	490	3482	0	1003	1792	1473	621	1863	1408	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)		13			8							109	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		255			718			281			219		
Travel Time (s)		5.8			16.3			6.4			5.0		
Confl. Peds. (#/hr)	12		13	13		12	27		30	30		27	
Confl. Bikes (#/hr)						1						3	
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90	0.76	0.76	0.76	0.91	0.91	0.91	
Heavy Vehicles (%)	26%	7%	15%	3%	2%	4%	2%	6%	5%	4%	2%	10%	
Adj. Flow (vph)	111	470	64	379	709	63	151	386	189	37	357	109	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	111	534	0	379	772	0	151	386	189	37	357	109	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	custom	NA	custom	
Protected Phases	7	4		3	8			2		1	1 6	1	6
Permitted Phases	4			8			2		2	6		6	
Detector Phase	7	4		3	8		2	2	2	1	6	1	
Switch Phase													
Minimum Initial (s)	4.0	10.0		4.0	10.0		8.0	8.0	8.0	4.0		4.0	8.0
Minimum Split (s)	9.0	27.0		9.0	27.0		39.0	39.0	39.0	10.0		10.0	39.0
Total Split (s)	15.0	35.0		15.0	35.0		40.0	40.0	40.0	24.0		24.0	64.0
Total Split (%)	13.2%	30.7%		13.2%	30.7%		35.1%	35.1%	35.1%	21.1%		21.1%	56%
Maximum Green (s)	10.0	30.0		10.0	30.0		34.0	34.0	34.0	18.0		18.0	58.0
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	None		None	Max
Walk Time (s)		5.0			5.0		5.0	5.0	5.0				5.0
Flash Dont Walk (s)		17.0			17.0		28.0	28.0	28.0				28.0
Pedestrian Calls (#/hr)		54			19		37	37	37				11
Act Effct Green (s)	37.6	28.0		38.4	28.4		45.2	45.2	45.2	58.1	58.1	58.1	
Actuated g/C Ratio	0.34	0.25		0.34	0.25		0.40	0.40	0.40	0.52	0.52	0.52	
v/c Ratio	0.68	0.65		1.38	0.87		0.37	0.53	0.32	0.10	0.37	0.14	
Control Delay	45.1	40.7		218.6	51.2		28.0	29.6	25.7	14.7	17.9	3.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	34.7	1.1	
Total Delay	45.1	40.7		218.6	51.2		28.0	29.6	25.7	14.7	52.6	4.3	
LOS	D	D		F	D		C	C	C	B	D	A	
Approach Delay		41.4			106.3			28.2			39.3		
Approach LOS		D			F			C			D		
Queue Length 50th (ft)	53	177		~264	279		78	214	94	13	153	0	
Queue Length 95th (ft)	#90	213		#461	#358		113	256	129	31	224	28	
Internal Link Dist (ft)		175			638			201			139		
Turn Bay Length (ft)	215			300								125	
Base Capacity (vph)	169	884		275	939		404	723	594	501	965	791	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	619	510	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Reduced v/c Ratio	0.66	0.60		1.38	0.82		0.37	0.53	0.32	0.07	1.03	0.39	

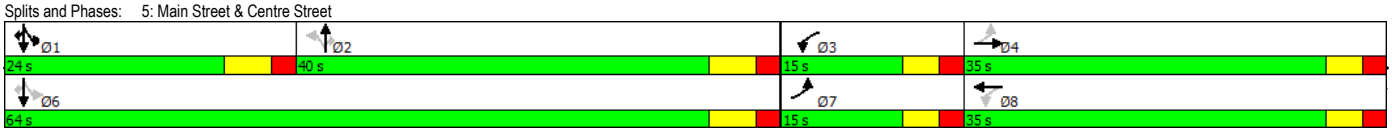
Intersection Summary

Area Type: Other
Cycle Length: 114
Actuated Cycle Length: 112.1
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.38
Intersection Signal Delay: 62.6 Intersection LOS: E
Intersection Capacity Utilization 82.7% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Main Street & Centre Street

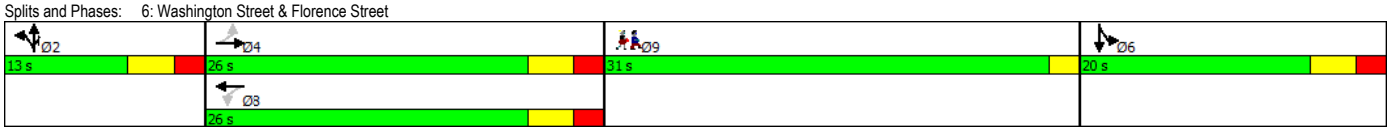


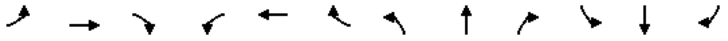
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	33	101	2	5	361	25	51	36	24	55	36	177	
Future Volume (vph)	33	101	2	5	361	25	51	36	24	55	36	177	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	100		0	0		100	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.998			0.990				0.850		0.911		
Flt Protected		0.988		0.950				0.971			0.990		
Satd. Flow (prot)	0	3284	0	1805	3445	0	0	1823	1553	0	1675	0	
Flt Permitted		0.792		0.650				0.971			0.990		
Satd. Flow (perm)	0	2633	0	1235	3445	0	0	1823	1553	0	1675	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		1			7				109		94		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		360			731			301			355		
Travel Time (s)		8.2			16.6			6.8			8.1		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.70	0.70	0.70	0.90	0.90	0.90	
Heavy Vehicles (%)	10%	8%	0%	0%	4%	0%	2%	0%	4%	8%	0%	1%	
Adj. Flow (vph)	39	120	2	6	430	30	73	51	34	61	40	197	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	161	0	6	460	0	0	124	34	0	298	0	
Turn Type	Perm	NA		Perm	NA		Split	NA	custom	Split	NA		
Protected Phases		4			8		2	2	2	6	6		9
Permitted Phases	4			8					2				
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		8.0	8.0	8.0	8.0	8.0		4.0
Minimum Split (s)	15.0	15.0		15.0	15.0		13.0	13.0	13.0	13.0	13.0		31.0
Total Split (s)	26.0	26.0		26.0	26.0		13.0	13.0	13.0	20.0	20.0		31.0
Total Split (%)	28.9%	28.9%		28.9%	28.9%		14.4%	14.4%	14.4%	22.2%	22.2%		34%
Maximum Green (s)	21.0	21.0		21.0	21.0		8.0	8.0	8.0	15.0	15.0		29.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		0.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0		5.0	5.0			5.0	5.0		5.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	Max	Max		Max	Max		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													22.0
Pedestrian Calls (#/hr)													97
Act Effct Green (s)		22.0		22.0	22.0			8.4	8.4		13.8		
Actuated g/C Ratio		0.27		0.27	0.27			0.10	0.10		0.17		
v/c Ratio		0.23		0.02	0.50			0.67	0.13		0.83		
Control Delay		28.6		27.0	30.5			59.8	1.1		45.5		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		28.6		27.0	30.5			59.8	1.1		45.5		
LOS		C		C	C			E	A		D		
Approach Delay		28.6			30.4			47.1			45.5		
Approach LOS		C			C			D			D		
Queue Length 50th (ft)		38		3	120			70	0		114		
Queue Length 95th (ft)		62		12	156			#104	0		#253		
Internal Link Dist (ft)		280			651			221			275		
Turn Bay Length (ft)				100					100				
Base Capacity (vph)		701		328	921			185	255		394		
Starvation Cap Reductn		0		0	0			0	0		0		
Spillback Cap Reductn		0		0	0			0	0		0		
Storage Cap Reductn		0		0	0			0	0		0		
Reduced v/c Ratio		0.23		0.02	0.50			0.67	0.13		0.76		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 82.6
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 36.7 Intersection LOS: D
Intersection Capacity Utilization 54.1% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Washington Street & Florence Street

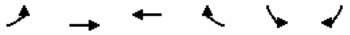




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	185	81	24	35	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	185	81	24	35	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.82	0.82	0.82	0.79	0.79	0.79	0.25	0.25	0.25
Hourly flow rate (vph)	0	0	0	0	226	99	30	44	0	0	0	0
Pedestrians		80									72	
Lane Width (ft)		0.0									0.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					363							
pX, platoon unblocked												
vC, conflicting volume	397			0			356	397	0	370	348	428
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	397			0			356	397	0	370	348	428
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			95	92	100	100	100	100
cM capacity (veh/h)	1173			1636			603	544	1091	554	579	631

Direction, Lane #	WB 1	NB 1
Volume Total	325	74
Volume Left	0	30
Volume Right	99	0
cSH	1700	566
Volume to Capacity	0.19	0.13
Queue Length 95th (ft)	0	11
Control Delay (s)	0.0	12.3
Lane LOS		B
Approach Delay (s)	0.0	12.3
Approach LOS		B

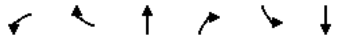
Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	26.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	164	370	51	67	22
Future Volume (Veh/h)	19	164	370	51	67	22
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.80	0.80	0.82	0.82
Hourly flow rate (vph)	20	171	463	64	82	27
Pedestrians		1	5		33	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	0		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		731	284			
pX, platoon unblocked						
vC, conflicting volume	560				658	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560				658	298
tC, single (s)	4.1				6.9	7.1
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	98				78	96
cM capacity (veh/h)	993				370	656

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	77	114	309	218	82	27
Volume Left	20	0	0	0	82	0
Volume Right	0	0	0	64	0	27
cSH	993	1700	1700	1700	370	656
Volume to Capacity	0.02	0.07	0.18	0.13	0.22	0.04
Queue Length 95th (ft)	2	0	0	0	21	3
Control Delay (s)	2.4	0.0	0.0	0.0	17.5	10.7
Lane LOS	A				C	B
Approach Delay (s)	1.0		0.0		15.8	
Approach LOS					C	

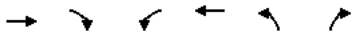
Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	30.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	41	42	17	59	53
Future Volume (Veh/h)	10	41	42	17	59	53
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.76	0.76	0.85	0.85
Hourly flow rate (vph)	10	42	55	22	69	62
Pedestrians	11		17			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	294	79			88	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	294	79			88	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	98	96			95	
cM capacity (veh/h)	634	976			1481	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	52	77	131
Volume Left	10	0	69
Volume Right	42	22	0
cSH	884	1700	1481
Volume to Capacity	0.06	0.05	0.05
Queue Length 95th (ft)	5	0	4
Control Delay (s)	9.3	0.0	4.1
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	4.1
Approach LOS	A		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	238	110	68	388	54	38
Future Volume (Veh/h)	238	110	68	388	54	38
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.75	0.75
Hourly flow rate (vph)	267	124	76	436	72	51
Pedestrians				21	60	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				2	5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			451		977	410
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			451		977	410
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		71	91
cM capacity (veh/h)			1064		247	597

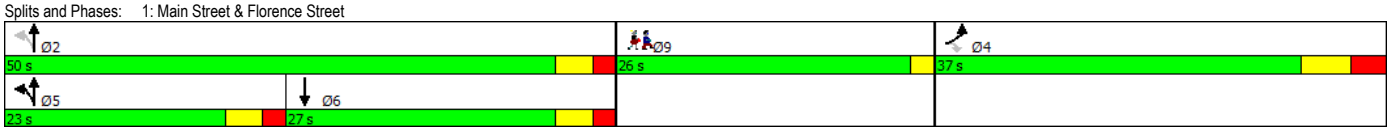
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	391	512	123
Volume Left	0	76	72
Volume Right	124	0	51
cSH	1700	1064	327
Volume to Capacity	0.23	0.07	0.38
Queue Length 95th (ft)	0	6	42
Control Delay (s)	0.0	2.0	22.5
Lane LOS		A	C
Approach Delay (s)	0.0	2.0	22.5
Approach LOS			C

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		64.6%	ICU Level of Service C
Analysis Period (min)		15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2	Ø9
Lane Configurations								
Traffic Volume (vph)	124	235	210	305	327	81		
Future Volume (vph)	124	235	210	305	327	81		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	10	13	13	11		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor	0.95	0.96		1.00	0.99			
Frt		0.850			0.973			
Flt Protected	0.950			0.980				
Satd. Flow (prot)	1787	1599	0	1886	1860	0		
Flt Permitted	0.950			0.139				
Satd. Flow (perm)	1700	1529	0	267	1860	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)		276			10			
Link Speed (mph)	30			30	30			
Link Distance (ft)	284			528	324			
Travel Time (s)	6.5			12.0	7.4			
Confl. Peds. (#/hr)	26	13	34			34		
Peak Hour Factor	0.85	0.85	0.92	0.92	0.78	0.78		
Heavy Vehicles (%)	1%	1%	5%	0%	1%	3%		
Adj. Flow (vph)	146	276	228	332	419	104		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	146	276	0	560	523	0		
Turn Type	Prot	Perm	custom	NA	NA			
Protected Phases	4		5	2 5	6		2	9
Permitted Phases		4	2					
Detector Phase	4	4	5	2 5	6			
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0		4.0		16.0	4.0
Minimum Split (s)	15.0	15.0	13.0		9.0		21.0	26.0
Total Split (s)	37.0	37.0	23.0		27.0		50.0	26.0
Total Split (%)	32.7%	32.7%	20.4%		23.9%		44%	23%
Maximum Green (s)	30.0	30.0	18.0		22.0		45.0	24.0
Yellow Time (s)	4.0	4.0	3.0		3.0		3.0	2.0
All-Red Time (s)	3.0	3.0	2.0		2.0		2.0	0.0
Lost Time Adjust (s)	0.0	0.0			0.0			
Total Lost Time (s)	7.0	7.0			5.0			
Lead/Lag			Lead		Lag			
Lead-Lag Optimize?			Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0
Recall Mode	None	None	None		Max		Max	None
Walk Time (s)								6.0
Flash Dont Walk (s)								18.0
Pedestrian Calls (#/hr)								15
Act Effct Green (s)	12.3	12.3		46.3	22.6			
Actuated g/C Ratio	0.16	0.16		0.62	0.30			
v/c Ratio	0.50	0.57		0.99	0.92			
Control Delay	36.1	9.5		58.3	50.7			
Queue Delay	0.0	0.0		0.0	0.0			
Total Delay	36.1	9.5		58.3	50.7			
LOS	D	A		E	D			
Approach Delay	18.7			58.3	50.7			
Approach LOS	B			E	D			
Queue Length 50th (ft)	56	0		171	196			
Queue Length 95th (ft)	137	55		#656	#516			
Internal Link Dist (ft)	204			448	244			
Turn Bay Length (ft)								
Base Capacity (vph)	738	793		566	570			
Starvation Cap Reductn	0	0		0	0			
Spillback Cap Reductn	0	0		0	0			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.20	0.35		0.99	0.92			

Intersection Summary			
Area Type:	Other		
Cycle Length: 113			
Actuated Cycle Length: 74.7			
Natural Cycle: 120			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 44.6		Intersection LOS: D	
Intersection Capacity Utilization 71.4%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Main Street & Florence Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	386	24	62	231	115	38	262	125	94	254	199
Future Volume (vph)	175	386	24	62	231	115	38	262	125	94	254	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	15	12	10	10	12	12	10	10	12	16	16
Storage Length (ft)	0		0	0		200	0		0	0		50
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	1.00		0.95	0.95			1.00	0.97		1.00	
Frt		0.991			0.950				0.850			0.850
Flt Protected	0.950			0.950				0.994			0.987	
Satd. Flow (prot)	1547	1968	0	1620	1547	0	0	1711	1492	0	2110	1777
Flt Permitted	0.950			0.512				0.758			0.568	
Satd. Flow (perm)	1423	1968	0	826	1547	0	0	1303	1443	0	1212	1777
Right Turn on Red			No			No			Yes			No
Satd. Flow (RTOR)									137			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		278			466			512			528	
Travel Time (s)		6.3			10.6			11.6			12.0	
Confl. Peds. (#/hr)	81		58	58		81	20		8	8		20
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.94	0.94
Heavy Vehicles (%)	5%	4%	18%	4%	5%	0%	3%	3%	1%	0%	1%	3%
Adj. Flow (vph)	184	406	25	68	254	126	42	288	137	100	270	212
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	431	0	68	380	0	0	330	137	0	370	212
Turn Type	Prot	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pt+ov
Protected Phases	5	2			6			8			4	4 5
Permitted Phases				6			8		8	4		
Detector Phase	5	2		6	6		8	8	8	4	4	5
Switch Phase												
Minimum Initial (s)	9.0	44.0		31.0	31.0		18.0	18.0	18.0	18.0	18.0	
Minimum Split (s)	14.0	49.0		36.0	36.0		36.0	36.0	36.0	36.0	36.0	
Total Split (s)	15.0	60.0		45.0	45.0		41.0	41.0	41.0	41.0	41.0	
Total Split (%)	14.9%	59.4%		44.6%	44.6%		40.6%	40.6%	40.6%	40.6%	40.6%	
Maximum Green (s)	10.0	55.0		40.0	40.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			6.0	6.0		6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None	None	None	None	
Walk Time (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Flash Dont Walk (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Pedestrian Calls (#/hr)				55	55		18	18	18	18	18	
Act Effct Green (s)	10.0	55.2		40.1	40.1			30.3	30.3		30.3	45.3
Actuated g/C Ratio	0.10	0.57		0.42	0.42			0.31	0.31		0.31	0.47
v/c Ratio	1.14	0.38		0.20	0.59			0.81	0.25		0.97	0.25
Control Delay	157.2	13.4		21.7	27.6			46.6	5.4		73.5	16.0
Queue Delay	0.0	5.8		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	157.2	19.3		21.7	27.6			46.6	5.4		73.5	16.0
LOS	F	B		C	C			D	A		E	B
Approach Delay		60.6			26.7			34.5			52.6	
Approach LOS		E			C			C			D	
Queue Length 50th (ft)	~142	149		28	188			184	0		222	75
Queue Length 95th (ft)	#281	224		61	294			#299	40		#395	122
Internal Link Dist (ft)		198			386			432			448	
Turn Bay Length (ft)												50
Base Capacity (vph)	161	1125		343	643			474	612		441	834
Starvation Cap Reductn	0	625		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	1.14	0.86		0.20	0.59			0.70	0.22		0.84	0.25

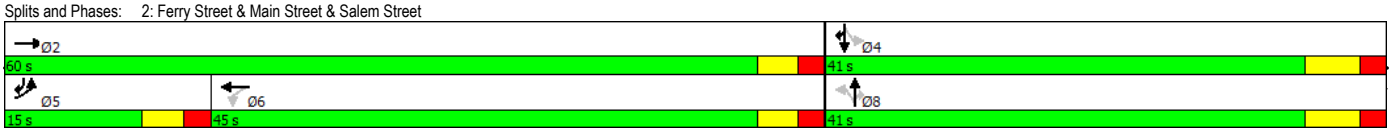
Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 96.5
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 45.4 Intersection LOS: D
Intersection Capacity Utilization 120.6% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Ferry Street & Main Street & Salem Street



Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR	Ø9
Lane Configurations								
Traffic Volume (vph)	0	0	137	587	10	333	128	
Future Volume (vph)	0	0	137	587	10	333	128	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00		0.99		
Frt						0.959		
Flt Protected				0.991		0.999		
Satd. Flow (prot)	0	0	0	3426	0	3278	0	
Flt Permitted				0.744		0.939		
Satd. Flow (perm)	0	0	0	2565	0	3081	0	
Right Turn on Red		Yes					Yes	
Satd. Flow (RTOR)						141		
Link Speed (mph)	30			30		30		
Link Distance (ft)	363			237		278		
Travel Time (s)	8.3			5.4		6.3		
Confl. Peds. (#/hr)			46				46	
Confl. Bikes (#/hr)							1	
Peak Hour Factor	0.25	0.25	0.95	0.95	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	0%	2%	5%	0%	5%	2%	
Adj. Flow (vph)	0	0	144	618	11	366	141	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	0	762	0	518	0	
Turn Type			Perm	NA	Perm	NA		
Protected Phases				2		6		9
Permitted Phases			2		6			
Detector Phase			2	2	6	6		
Switch Phase								
Minimum Initial (s)			10.0	10.0	10.0	10.0		4.0
Minimum Split (s)			20.0	20.0	20.0	20.0		19.0
Total Split (s)			84.0	84.0	84.0	84.0		19.0
Total Split (%)			81.6%	81.6%	81.6%	81.6%		18%
Maximum Green (s)			80.0	80.0	80.0	80.0		17.0
Yellow Time (s)			3.0	3.0	3.0	3.0		2.0
All-Red Time (s)			1.0	1.0	1.0	1.0		0.0
Lost Time Adjust (s)				0.0		0.0		
Total Lost Time (s)				4.0		4.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0	3.0	3.0	3.0		3.0
Recall Mode			Max	Max	Max	Max		None
Walk Time (s)								11.0
Flash Dont Walk (s)								6.0
Pedestrian Calls (#/hr)								0
Act Effct Green (s)				99.0		99.0		
Actuated g/C Ratio				1.00		1.00		
v/c Ratio				0.30		0.17		
Control Delay				0.3		0.1		
Queue Delay				0.0		0.0		
Total Delay				0.3		0.1		
LOS				A		A		
Approach Delay				0.3		0.1		
Approach LOS				A		A		
Queue Length 50th (ft)				0		0		
Queue Length 95th (ft)				0		0		
Internal Link Dist (ft)	283			157		198		
Turn Bay Length (ft)								
Base Capacity (vph)				2565		3081		
Starvation Cap Reductn				0		0		
Spillback Cap Reductn				0		0		
Storage Cap Reductn				0		0		
Reduced v/c Ratio				0.30		0.17		

Intersection Summary			
Area Type:	Other		
Cycle Length: 103			
Actuated Cycle Length: 99			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 0.2		Intersection LOS: A	
Intersection Capacity Utilization 41.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Main Street & Pleasant Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	141	4	131	0	0	0	0	579	20	5	333	0	
Future Volume (vph)	141	4	131	0	0	0	0	579	20	5	333	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	11	12	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor	0.95	0.92						1.00			1.00		
Frt		0.854						0.995					
Flt Protected	0.950										0.999		
Satd. Flow (prot)	1805	1649	0	0	0	0	0	3421	0	0	3354	0	
Flt Permitted	0.950										0.949		
Satd. Flow (perm)	1716	1649	0	0	0	0	0	3421	0	0	3186	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		146						5					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		234			280			219			237		
Travel Time (s)		5.3			6.4			5.0			5.4		
Confl. Peds. (#/hr)	31		45						29	29			
Confl. Bikes (#/hr)									3				
Peak Hour Factor	0.90	0.90	0.90	0.25	0.25	0.25	0.90	0.90	0.90	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	25%	2%	0%	0%	0%	0%	5%	0%	0%	4%	0%	
Adj. Flow (vph)	157	4	146	0	0	0	0	643	22	5	358	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	157	150	0	0	0	0	0	665	0	0	363	0	
Turn Type	Perm	NA						NA		Perm	NA		
Protected Phases		4						2			6		9
Permitted Phases	4									6			
Detector Phase	4	4						2		6	6		
Switch Phase													
Minimum Initial (s)	8.0	8.0						10.0		10.0	10.0		4.0
Minimum Split (s)	12.0	12.0						14.0		14.0	14.0		20.0
Total Split (s)	24.0	24.0						62.0		62.0	62.0		20.0
Total Split (%)	22.6%	22.6%						58.5%		58.5%	58.5%		19%
Maximum Green (s)	20.0	20.0						58.0		58.0	58.0		18.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0						0.0			0.0		
Total Lost Time (s)	4.0	4.0						4.0			4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0		3.0
Recall Mode	None	None						Max		Max	Max		None
Walk Time (s)													4.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													0
Act Effct Green (s)	12.6	12.6						58.1			58.1		
Actuated g/C Ratio	0.16	0.16						0.74			0.74		
v/c Ratio	0.58	0.39						0.26			0.15		
Control Delay	39.1	8.9						4.0			3.6		
Queue Delay	0.0	0.0						1.3			0.5		
Total Delay	39.1	8.9						5.3			4.1		
LOS	D	A						A			A		
Approach Delay		24.3						5.3			4.1		
Approach LOS		C						A			A		
Queue Length 50th (ft)	72	2						42			21		
Queue Length 95th (ft)	129	48						82			45		
Internal Link Dist (ft)		154			200			139			157		
Turn Bay Length (ft)													
Base Capacity (vph)	437	528						2527			2353		
Starvation Cap Reductn	0	0						1592			1535		
Spillback Cap Reductn	0	0						0			0		
Storage Cap Reductn	0	0						0			0		
Reduced v/c Ratio	0.36	0.28						0.71			0.44		

Intersection Summary			
Area Type:	Other		
Cycle Length: 106			
Actuated Cycle Length: 78.7			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 9.3		Intersection LOS: A	
Intersection Capacity Utilization 35.3%		ICU Level of Service A	
Analysis Period (min) 15			

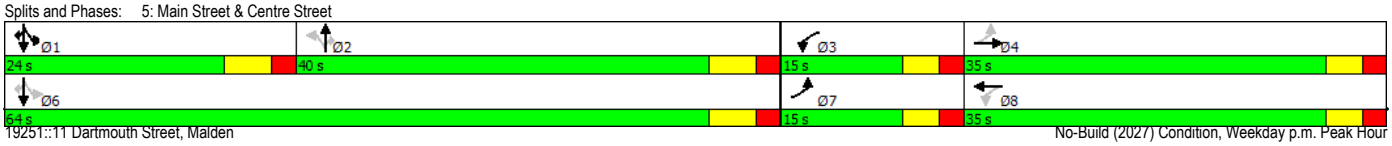
Splits and Phases: 4: Main Street & Exchange Street/Irving Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø6
Lane Configurations													
Traffic Volume (vph)	198	697	60	196	356	60	73	356	307	47	304	94	
Future Volume (vph)	198	697	60	196	356	60	73	356	307	47	304	94	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	12	11	12	12	12	12	12	12	12	12	
Storage Length (ft)	215		0	300		0	0		0	0		125	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.99	0.99		0.98	1.00		0.96		0.97	0.99		0.93	
Frt		0.988			0.978				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1560	3466	0	1711	3486	0	1719	1845	1568	1805	1845	1455	
Flt Permitted	0.367			0.138			0.561			0.342			
Satd. Flow (perm)	598	3466	0	244	3486	0	979	1845	1517	645	1845	1357	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)		8			16							102	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		255			718			281			219		
Travel Time (s)		5.8			16.3			6.4			5.0		
Confl. Peds. (#/hr)	11		37	37		11	54		19	19		54	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.96	0.96	0.96	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	8%	1%	13%	2%	1%	0%	5%	3%	3%	0%	3%	11%	
Adj. Flow (vph)	206	726	63	209	379	64	78	383	330	51	330	102	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	206	789	0	209	443	0	78	383	330	51	330	102	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	custom	NA	custom	
Protected Phases	7	4		3	8			2		1	1 6	1	6
Permitted Phases	4			8			2		2	6		6	
Detector Phase	7	4		3	8		2	2	2	1	6	1	
Switch Phase													
Minimum Initial (s)	4.0	10.0		4.0	10.0		8.0	8.0	8.0	4.0		4.0	8.0
Minimum Split (s)	9.0	27.0		9.0	27.0		39.0	39.0	39.0	10.0		10.0	39.0
Total Split (s)	15.0	35.0		15.0	35.0		40.0	40.0	40.0	24.0		24.0	64.0
Total Split (%)	13.2%	30.7%		13.2%	30.7%		35.1%	35.1%	35.1%	21.1%		21.1%	56%
Maximum Green (s)	10.0	30.0		10.0	30.0		34.0	34.0	34.0	18.0		18.0	58.0
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	None		None	Max
Walk Time (s)		5.0			5.0		5.0	5.0	5.0				5.0
Flash Dont Walk (s)		17.0			17.0		28.0	28.0	28.0				28.0
Pedestrian Calls (#/hr)		54			19		37	37	37				11
Act Effct Green (s)	38.9	28.9		38.9	28.9		44.9	44.9	44.9	58.0	58.0	58.0	
Actuated g/C Ratio	0.34	0.26		0.34	0.26		0.40	0.40	0.40	0.51	0.51	0.51	
v/c Ratio	0.71	0.88		0.98	0.49		0.20	0.52	0.55	0.13	0.35	0.14	
Control Delay	40.6	52.7		85.5	36.4		25.0	29.6	31.0	15.0	17.8	3.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	30.9	1.1	
Total Delay	40.6	52.7		85.5	36.4		25.0	29.6	31.0	15.0	48.7	4.4	
LOS	D	D		F	D		C	C	C	B	D	A	
Approach Delay		50.2			52.1			29.8			35.8		
Approach LOS		D			D			C			D		
Queue Length 50th (ft)	104	288		104	138		37	212	185	18	139	0	
Queue Length 95th (ft)	#176	#387		#260	190		76	316	286	39	206	27	
Internal Link Dist (ft)		175			638			201			139		
Turn Bay Length (ft)	215			300								125	
Base Capacity (vph)	291	927		214	938		389	733	603	516	947	762	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	622	492	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Reduced v/c Ratio	0.71	0.85		0.98	0.47		0.20	0.52	0.55	0.10	1.02	0.38	

Intersection Summary

Area Type: Other
Cycle Length: 114
Actuated Cycle Length: 112.9
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 42.7 Intersection LOS: D
Intersection Capacity Utilization 81.5% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Main Street & Centre Street

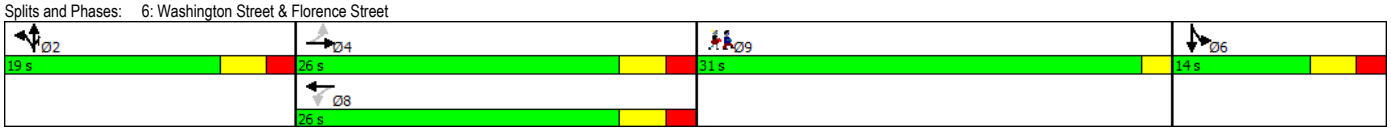


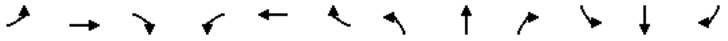
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	65	209	3	1	203	29	36	49	41	54	8	64	
Future Volume (vph)	65	209	3	1	203	29	36	49	41	54	8	64	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	100		0	0		100	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.998			0.981				0.850		0.932		
Flt Protected		0.988		0.950				0.979			0.979		
Satd. Flow (prot)	0	3444	0	1805	3393	0	0	1839	1568	0	1734	0	
Flt Permitted		0.817		0.572				0.979			0.979		
Satd. Flow (perm)	0	2848	0	1087	3393	0	0	1839	1568	0	1734	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		1			16				109		46		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		360			731			301			355		
Travel Time (s)		8.2			16.6			6.8			8.1		
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.88	0.88	0.88	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	4%	33%	0%	5%	0%	0%	2%	3%	0%	0%	0%	
Adj. Flow (vph)	69	222	3	1	233	33	41	56	47	58	9	69	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	294	0	1	266	0	0	97	47	0	136	0	
Turn Type	Perm	NA		Perm	NA		Split	NA	custom	Split	NA		
Protected Phases		4			8		2	2	2	6	6		9
Permitted Phases	4			8					2				
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		8.0	8.0	8.0	8.0	8.0		4.0
Minimum Split (s)	15.0	15.0		15.0	15.0		13.0	13.0	13.0	13.0	13.0		31.0
Total Split (s)	26.0	26.0		26.0	26.0		19.0	19.0	19.0	14.0	14.0		31.0
Total Split (%)	28.9%	28.9%		28.9%	28.9%		21.1%	21.1%	21.1%	15.6%	15.6%		34%
Maximum Green (s)	21.0	21.0		21.0	21.0		14.0	14.0	14.0	9.0	9.0		29.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		0.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0		5.0	5.0			5.0	5.0		5.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	Max	Max		Max	Max		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													22.0
Pedestrian Calls (#/hr)													100
Act Effct Green (s)		30.5		30.5	30.5			10.7	10.7		9.3		
Actuated g/C Ratio		0.39		0.39	0.39			0.14	0.14		0.12		
v/c Ratio		0.26		0.00	0.20			0.38	0.15		0.55		
Control Delay		27.3		26.0	25.0			39.8	1.0		36.2		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		27.3		26.0	25.0			39.8	1.0		36.2		
LOS		C		C	C			D	A		D		
Approach Delay		27.3			25.0			27.1			36.2		
Approach LOS		C			C			C			D		
Queue Length 50th (ft)		70		0	57			50	0		47		
Queue Length 95th (ft)		114		4	93			95	0		#122		
Internal Link Dist (ft)		280			651			221			275		
Turn Bay Length (ft)				100					100				
Base Capacity (vph)		1123		428	1347			363	397		260		
Starvation Cap Reductn		0		0	0			0	0		0		
Spillback Cap Reductn		0		0	0			0	0		0		
Storage Cap Reductn		0		0	0			0	0		0		
Reduced v/c Ratio		0.26		0.00	0.20			0.27	0.12		0.52		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 77.5
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 28.0 Intersection LOS: C
Intersection Capacity Utilization 43.2% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Washington Street & Florence Street

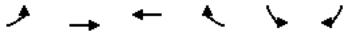




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	184	84	57	61	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	184	84	57	61	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.91	0.91	0.91	0.87	0.87	0.87	0.25	0.25	0.25
Hourly flow rate (vph)	0	0	0	0	202	92	66	70	0	0	0	0
Pedestrians		109									98	
Lane Width (ft)		0.0									0.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					363							
pX, platoon unblocked												
vC, conflicting volume	392			0			357	392	0	381	346	455
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	392			0			357	392	0	381	346	455
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			89	87	100	100	100	100
cM capacity (veh/h)	1178			1636			602	544	1091	523	580	609

Direction, Lane #	WB 1	NB 1
Volume Total	294	136
Volume Left	0	66
Volume Right	92	0
cSH	1700	571
Volume to Capacity	0.17	0.24
Queue Length 95th (ft)	0	23
Control Delay (s)	0.0	13.3
Lane LOS		B
Approach Delay (s)	0.0	13.3
Approach LOS		B

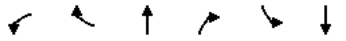
Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	29.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	267	192	53	105	39
Future Volume (Veh/h)	24	267	192	53	105	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	26	293	221	61	121	45
Pedestrians		2	11		37	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	1		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		731	284			
pX, platoon unblocked						
vC, conflicting volume	319				498	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	319				498	180
tC, single (s)	4.2				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				75	94
cM capacity (veh/h)	1186				476	811

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	124	195	147	135	121	45
Volume Left	26	0	0	0	121	0
Volume Right	0	0	0	61	0	45
cSH	1186	1700	1700	1700	476	811
Volume to Capacity	0.02	0.11	0.09	0.08	0.25	0.06
Queue Length 95th (ft)	2	0	0	0	25	4
Control Delay (s)	1.9	0.0	0.0	0.0	15.1	9.7
Lane LOS	A				C	A
Approach Delay (s)	0.7		0.0		13.7	
Approach LOS					B	

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	61	82	45	56	36
Future Volume (Veh/h)	4	61	82	45	56	36
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	4	69	95	52	71	46
Pedestrians	13		2			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	324	138			160	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	324	138			160	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	92			95	
cM capacity (veh/h)	632	897			1416	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	73	147	117
Volume Left	4	0	71
Volume Right	69	52	0
cSH	877	1700	1416
Volume to Capacity	0.08	0.09	0.05
Queue Length 95th (ft)	7	0	4
Control Delay (s)	9.5	0.0	4.8
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	4.8
Approach LOS	A		

Intersection Summary				
Average Delay		3.7		
Intersection Capacity Utilization		30.1%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	280	81	58	195	95	92
Future Volume (Veh/h)	280	81	58	195	95	92
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	322	93	65	219	120	116
Pedestrians	1			16	62	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			1	5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			477		780	446
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			477		780	446
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			94		63	80
cM capacity (veh/h)			1010		322	567

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	415	284	236
Volume Left	0	65	120
Volume Right	93	0	116
cSH	1700	1010	409
Volume to Capacity	0.24	0.06	0.58
Queue Length 95th (ft)	0	5	88
Control Delay (s)	0.0	2.5	25.1
Lane LOS		A	D
Approach Delay (s)	0.0	2.5	25.1
Approach LOS			D

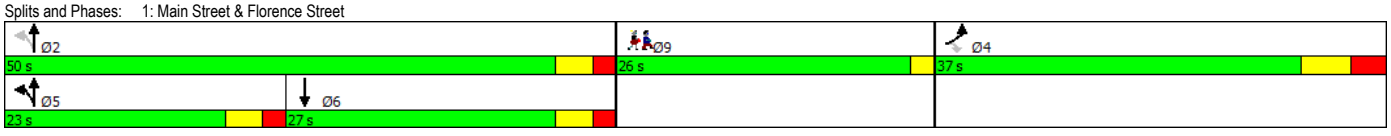
Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2	Ø9
Lane Configurations								
Traffic Volume (vph)	63	176	238	254	305	153		
Future Volume (vph)	63	176	238	254	305	153		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	10	13	13	11		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor	0.96	0.96		1.00	0.99			
Frt		0.850			0.955			
Flt Protected	0.950			0.976				
Satd. Flow (prot)	1687	1568	0	1825	1782	0		
Flt Permitted	0.950			0.199				
Satd. Flow (perm)	1617	1508	0	371	1782	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)		202			20			
Link Speed (mph)	30			30	30			
Link Distance (ft)	284			528	324			
Travel Time (s)	6.5			12.0	7.4			
Confl. Peds. (#/hr)	22	10	17			17		
Confl. Bikes (#/hr)						6		
Peak Hour Factor	0.87	0.87	0.89	0.89	0.94	0.94		
Heavy Vehicles (%)	7%	3%	5%	5%	5%	1%		
Adj. Flow (vph)	72	202	267	285	324	163		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	72	202	0	552	487	0		
Turn Type	Prot	Perm	custom	NA	NA			
Protected Phases	4		5	2 5	6		2	9
Permitted Phases		4	2					
Detector Phase	4	4	5	2 5	6			
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0		4.0		16.0	4.0
Minimum Split (s)	15.0	15.0	13.0		9.0		21.0	26.0
Total Split (s)	37.0	37.0	23.0		27.0		50.0	26.0
Total Split (%)	32.7%	32.7%	20.4%		23.9%		44%	23%
Maximum Green (s)	30.0	30.0	18.0		22.0		45.0	24.0
Yellow Time (s)	4.0	4.0	3.0		3.0		3.0	2.0
All-Red Time (s)	3.0	3.0	2.0		2.0		2.0	0.0
Lost Time Adjust (s)	0.0	0.0			0.0			
Total Lost Time (s)	7.0	7.0			5.0			
Lead/Lag			Lead		Lag			
Lead-Lag Optimize?			Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0
Recall Mode	None	None	None		Max		Max	None
Walk Time (s)								6.0
Flash Dont Walk (s)								18.0
Pedestrian Calls (#/hr)								15
Act Effct Green (s)	9.5	9.5		46.0	22.5			
Actuated g/C Ratio	0.13	0.13		0.64	0.31			
v/c Ratio	0.32	0.54		0.90	0.85			
Control Delay	34.8	11.3		36.4	40.4			
Queue Delay	0.0	0.0		0.0	0.0			
Total Delay	34.8	11.3		36.4	40.4			
LOS	C	B		D	D			
Approach Delay	17.5			36.4	40.4			
Approach LOS	B			D	D			
Queue Length 50th (ft)	27	0		126	165			
Queue Length 95th (ft)	80	56		#548	#540			
Internal Link Dist (ft)	204			448	244			
Turn Bay Length (ft)								
Base Capacity (vph)	722	760		611	573			
Starvation Cap Reductn	0	0		0	0			
Spillback Cap Reductn	0	0		0	0			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.10	0.27		0.90	0.85			

Intersection Summary

Area Type: Other
Cycle Length: 113
Actuated Cycle Length: 71.7
Natural Cycle: 110
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 33.9 Intersection LOS: C
Intersection Capacity Utilization 73.3% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Main Street & Florence Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	235	25	88	293	198	55	241	132	111	185	245
Future Volume (vph)	123	235	25	88	293	198	55	241	132	111	185	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	15	12	10	10	12	12	10	10	12	16	16
Storage Length (ft)	0		0	0		200	0		0	0		50
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	0.98		0.80	0.92			1.00	0.79		0.96	
Frt		0.985			0.940				0.850			0.850
Flt Protected	0.950			0.950				0.991			0.982	
Satd. Flow (prot)	1438	1856	0	1668	1483	0	0	1737	1492	0	2058	1812
Flt Permitted	0.950			0.562				0.713			0.515	
Satd. Flow (perm)	1316	1856	0	786	1483	0	0	1246	1172	0	1039	1812
Right Turn on Red			No			No			Yes			No
Satd. Flow (RTOR)									159			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		278			466			512			528	
Travel Time (s)		6.3			10.6			11.6			12.0	
Confl. Peds. (#/hr)	108		191	191		108	33		118	118		33
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.79	0.79	0.79	0.89	0.89	0.89	0.83	0.83	0.83	0.84	0.84	0.84
Heavy Vehicles (%)	13%	8%	17%	1%	5%	1%	2%	1%	1%	4%	2%	1%
Adj. Flow (vph)	156	297	32	99	329	222	66	290	159	132	220	292
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	329	0	99	551	0	0	356	159	0	352	292
Turn Type	Prot	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pt+ov
Protected Phases	5	2			6			8			4	4 5
Permitted Phases				6			8		8	4		
Detector Phase	5	2		6	6		8	8	8	4	4	5
Switch Phase												
Minimum Initial (s)	9.0	44.0		31.0	31.0		18.0	18.0	18.0	18.0	18.0	
Minimum Split (s)	14.0	49.0		36.0	36.0		36.0	36.0	36.0	36.0	36.0	
Total Split (s)	15.0	60.0		45.0	45.0		41.0	41.0	41.0	41.0	41.0	
Total Split (%)	14.9%	59.4%		44.6%	44.6%		40.6%	40.6%	40.6%	40.6%	40.6%	
Maximum Green (s)	10.0	55.0		40.0	40.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			6.0	6.0		6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None	None	None	None	
Walk Time (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Flash Dont Walk (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Pedestrian Calls (#/hr)				55	55		18	18	18	18	18	
Act Effct Green (s)	10.0	55.0		40.0	40.0			35.0	35.0		35.0	50.0
Actuated g/C Ratio	0.10	0.54		0.40	0.40			0.35	0.35		0.35	0.50
v/c Ratio	1.10	0.33		0.32	0.94			0.83	0.31		0.98	0.33
Control Delay	148.5	13.9		24.7	55.6			48.1	5.6		76.7	16.6
Queue Delay	0.0	5.3		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	148.5	19.2		24.7	55.6			48.1	5.6		76.7	16.6
LOS	F	B		C	E			D	A		E	B
Approach Delay		60.8			50.9			35.0			49.5	
Approach LOS		E			D			C			D	
Queue Length 50th (ft)	~114	111		43	335			208	0		222	109
Queue Length 95th (ft)	#201	142		86	#542			#314	34		#364	153
Internal Link Dist (ft)		198			386			432			448	
Turn Bay Length (ft)												50
Base Capacity (vph)	142	1010		311	587			431	510		360	897
Starvation Cap Reductn	0	607		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	1.10	0.82		0.32	0.94			0.83	0.31		0.98	0.33

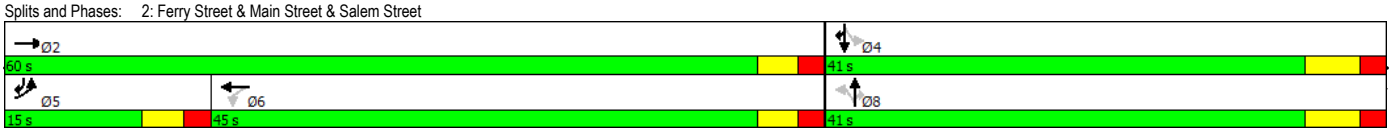
Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 101
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 49.0 Intersection LOS: D
Intersection Capacity Utilization 127.6% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Ferry Street & Main Street & Salem Street



Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR	Ø9
Lane Configurations								
Traffic Volume (vph)	0	0	112	362	4	447	179	
Future Volume (vph)	0	0	112	362	4	447	179	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00		0.99		
Frt						0.957		
Flt Protected				0.988				
Satd. Flow (prot)	0	0	0	3276	0	3308	0	
Flt Permitted				0.684		0.953		
Satd. Flow (perm)	0	0	0	2263	0	3153	0	
Right Turn on Red		Yes					Yes	
Satd. Flow (RTOR)						184		
Link Speed (mph)	30			30		30		
Link Distance (ft)	363			237		278		
Travel Time (s)	8.3			5.4		6.3		
Confl. Peds. (#/hr)			36				36	
Confl. Bikes (#/hr)							3	
Peak Hour Factor	0.25	0.25	0.80	0.80	0.97	0.97	0.97	
Heavy Vehicles (%)	0%	0%	2%	11%	0%	4%	1%	
Adj. Flow (vph)	0	0	140	453	4	461	185	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	0	593	0	650	0	
Turn Type			Perm	NA	Perm	NA		
Protected Phases				2		6		9
Permitted Phases			2		6			
Detector Phase			2	2	6	6		
Switch Phase								
Minimum Initial (s)			10.0	10.0	10.0	10.0		4.0
Minimum Split (s)			20.0	20.0	20.0	20.0		19.0
Total Split (s)			84.0	84.0	84.0	84.0		19.0
Total Split (%)			81.6%	81.6%	81.6%	81.6%		18%
Maximum Green (s)			80.0	80.0	80.0	80.0		17.0
Yellow Time (s)			3.0	3.0	3.0	3.0		2.0
All-Red Time (s)			1.0	1.0	1.0	1.0		0.0
Lost Time Adjust (s)				0.0		0.0		
Total Lost Time (s)				4.0		4.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0	3.0	3.0	3.0		3.0
Recall Mode			Max	Max	Max	Max		None
Walk Time (s)								11.0
Flash Dont Walk (s)								6.0
Pedestrian Calls (#/hr)								0
Act Effct Green (s)				99.0		99.0		
Actuated g/C Ratio				1.00		1.00		
v/c Ratio				0.26		0.21		
Control Delay				0.3		0.1		
Queue Delay				0.0		0.0		
Total Delay				0.3		0.1		
LOS				A		A		
Approach Delay				0.3		0.1		
Approach LOS				A		A		
Queue Length 50th (ft)				0		0		
Queue Length 95th (ft)				0		0		
Internal Link Dist (ft)	283			157		198		
Turn Bay Length (ft)								
Base Capacity (vph)				2263		3153		
Starvation Cap Reductn				0		0		
Spillback Cap Reductn				0		0		
Storage Cap Reductn				0		0		
Reduced v/c Ratio				0.26		0.21		

Intersection Summary			
Area Type:	Other		
Cycle Length: 103			
Actuated Cycle Length: 99			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 0.2		Intersection LOS: A	
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Main Street & Pleasant Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	45	4	54	0	0	0	0	437	24	12	436	0	
Future Volume (vph)	45	4	54	0	0	0	0	437	24	12	436	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	11	12	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor	0.96	0.92						1.00			1.00		
Frt		0.861						0.992					
Flt Protected	0.950										0.999		
Satd. Flow (prot)	1752	1697	0	0	0	0	0	3293	0	0	3355	0	
Flt Permitted	0.950										0.940		
Satd. Flow (perm)	1680	1697	0	0	0	0	0	3293	0	0	3157	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		65						8					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		234			280			219			237		
Travel Time (s)		5.3			6.4			5.0			5.4		
Confl. Peds. (#/hr)	26		51						24	24			
Peak Hour Factor	0.83	0.83	0.83	0.25	0.25	0.25	0.76	0.76	0.76	0.97	0.97	0.97	
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	9%	0%	0%	4%	0%	
Adj. Flow (vph)	54	5	65	0	0	0	0	575	32	12	449	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	54	70	0	0	0	0	0	607	0	0	461	0	
Turn Type	Perm	NA						NA		Perm	NA		
Protected Phases		4						2			6		9
Permitted Phases	4									6			
Detector Phase	4	4						2		6	6		
Switch Phase													
Minimum Initial (s)	8.0	8.0						10.0		10.0	10.0		4.0
Minimum Split (s)	12.0	12.0						14.0		14.0	14.0		20.0
Total Split (s)	24.0	24.0						62.0		62.0	62.0		20.0
Total Split (%)	22.6%	22.6%						58.5%		58.5%	58.5%		19%
Maximum Green (s)	20.0	20.0						58.0		58.0	58.0		18.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0						0.0			0.0		
Total Lost Time (s)	4.0	4.0						4.0			4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0		3.0
Recall Mode	None	None						Max		Max	Max		None
Walk Time (s)													4.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													0
Act Effct Green (s)	8.6	8.6						61.7			61.7		
Actuated g/C Ratio	0.11	0.11						0.82			0.82		
v/c Ratio	0.28	0.28						0.22			0.18		
Control Delay	34.2	12.8						2.3			2.2		
Queue Delay	0.0	0.0						0.6			0.4		
Total Delay	34.2	12.8						2.9			2.6		
LOS	C	B						A			A		
Approach Delay		22.2						2.9			2.6		
Approach LOS		C						A			A		
Queue Length 50th (ft)	23	2						26			20		
Queue Length 95th (ft)	51	31						37			35		
Internal Link Dist (ft)		154			200			139			157		
Turn Bay Length (ft)													
Base Capacity (vph)	447	499						2705			2592		
Starvation Cap Reductn	0	0						1648			1562		
Spillback Cap Reductn	0	0						0			0		
Storage Cap Reductn	0	0						0			0		
Reduced v/c Ratio	0.12	0.14						0.57			0.45		

Intersection Summary			
Area Type:	Other		
Cycle Length: 106			
Actuated Cycle Length: 75.2			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 4.8		Intersection LOS: A	
Intersection Capacity Utilization 34.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Main Street & Exchange Street/Irving Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø6
Lane Configurations													
Traffic Volume (vph)	92	390	53	341	661	57	115	306	144	34	328	99	
Future Volume (vph)	92	390	53	341	661	57	115	306	144	34	328	99	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	12	11	12	12	12	12	12	12	12	12	
Storage Length (ft)	215		0	300		0	0		0	0		75	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	1.00	0.99		0.99	1.00		0.98		0.96	0.99		0.96	
Frt		0.982			0.988				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1337	3263	0	1694	3483	0	1770	1792	1538	1736	1863	1468	
Flt Permitted	0.141			0.281			0.546			0.323			
Satd. Flow (perm)	198	3263	0	495	3483	0	1000	1792	1473	583	1863	1408	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)		13			8							78	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		255			718			281			219		
Travel Time (s)		5.8			16.3			6.4			5.0		
Confl. Peds. (#/hr)	12		13	13		12	27		30	30		27	
Confl. Bikes (#/hr)						1						3	
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90	0.76	0.76	0.76	0.91	0.91	0.91	
Heavy Vehicles (%)	26%	7%	15%	3%	2%	4%	2%	6%	5%	4%	2%	10%	
Adj. Flow (vph)	111	470	64	379	734	63	151	403	189	37	360	109	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	111	534	0	379	797	0	151	403	189	37	360	109	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	custom	NA	custom	
Protected Phases	7	4		3	8			2		1	1 6	1	6
Permitted Phases	4			8			2		2	6		6	
Detector Phase	7	4		3	8		2	2	2	1	6	1	
Switch Phase													
Minimum Initial (s)	4.0	10.0		4.0	10.0		8.0	8.0	8.0	4.0		4.0	8.0
Minimum Split (s)	9.0	27.0		9.0	27.0		39.0	39.0	39.0	10.0		10.0	39.0
Total Split (s)	15.0	35.0		15.0	35.0		40.0	40.0	40.0	24.0		24.0	64.0
Total Split (%)	13.2%	30.7%		13.2%	30.7%		35.1%	35.1%	35.1%	21.1%		21.1%	56%
Maximum Green (s)	10.0	30.0		10.0	30.0		34.0	34.0	34.0	18.0		18.0	58.0
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	None		None	Max
Walk Time (s)		5.0			5.0		5.0	5.0	5.0				5.0
Flash Dont Walk (s)		17.0			17.0		28.0	28.0	28.0				28.0
Pedestrian Calls (#/hr)		54			19		37	37	37				11
Act Effct Green (s)	37.9	28.4		38.8	28.8		44.7	44.7	44.7	58.0	58.0	58.0	
Actuated g/C Ratio	0.34	0.25		0.35	0.26		0.40	0.40	0.40	0.52	0.52	0.52	
v/c Ratio	0.68	0.64		1.37	0.89		0.38	0.57	0.32	0.10	0.37	0.14	
Control Delay	45.3	40.4		214.8	52.8		28.7	31.0	26.3	14.8	18.1	5.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	39.3	1.3	
Total Delay	45.3	40.4		214.8	52.8		28.7	31.0	26.3	14.8	57.4	7.1	
LOS	D	D		F	D		C	C	C	B	E	A	
Approach Delay		41.3			105.0			29.3			43.4		
Approach LOS		D			F			C			D		
Queue Length 50th (ft)	53	177		~262	291		78	227	94	13	155	11	
Queue Length 95th (ft)	#94	213		#459	#392		116	274	132	31	226	40	
Internal Link Dist (ft)		175			638			201			139		
Turn Bay Length (ft)	215			300								75	
Base Capacity (vph)	169	881		277	935		398	713	586	485	961	774	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	617	510	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Reduced v/c Ratio	0.66	0.61		1.37	0.85		0.38	0.57	0.32	0.08	1.05	0.41	

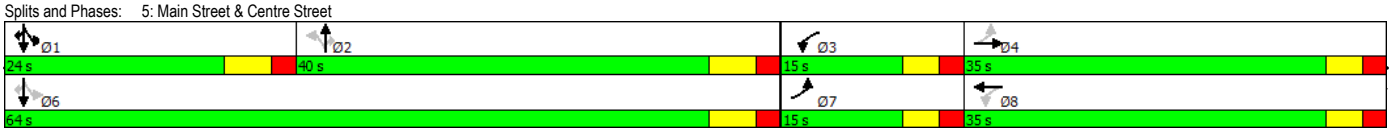
Intersection Summary

Area Type: Other
Cycle Length: 114
Actuated Cycle Length: 112.4
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.37
Intersection Signal Delay: 63.2 Intersection LOS: E
Intersection Capacity Utilization 82.7% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Main Street & Centre Street

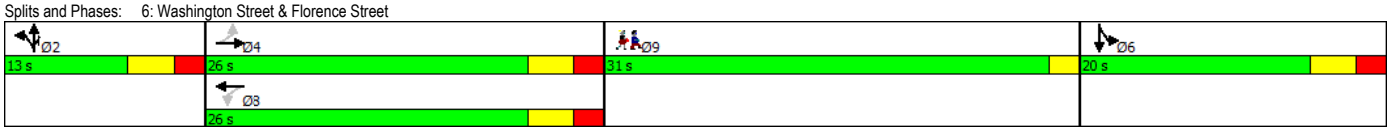


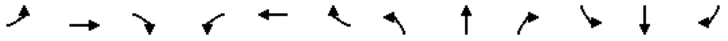
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	33	101	2	5	361	25	58	36	24	55	36	177	
Future Volume (vph)	33	101	2	5	361	25	58	36	24	55	36	177	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	100		0	0		100	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.998			0.990				0.850		0.911		
Flt Protected		0.988		0.950				0.970			0.990		
Satd. Flow (prot)	0	3284	0	1805	3445	0	0	1820	1553	0	1675	0	
Flt Permitted		0.792		0.650				0.970			0.990		
Satd. Flow (perm)	0	2633	0	1235	3445	0	0	1820	1553	0	1675	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		1			7				109		94		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		360			731			301			355		
Travel Time (s)		8.2			16.6			6.8			8.1		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.70	0.70	0.70	0.90	0.90	0.90	
Heavy Vehicles (%)	10%	8%	0%	0%	4%	0%	2%	0%	4%	8%	0%	1%	
Adj. Flow (vph)	39	120	2	6	430	30	83	51	34	61	40	197	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	161	0	6	460	0	0	134	34	0	298	0	
Turn Type	Perm	NA		Perm	NA		Split	NA	custom	Split	NA		
Protected Phases		4			8		2	2	2	6	6		9
Permitted Phases	4			8					2				
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		8.0	8.0	8.0	8.0	8.0		4.0
Minimum Split (s)	15.0	15.0		15.0	15.0		13.0	13.0	13.0	13.0	13.0		31.0
Total Split (s)	26.0	26.0		26.0	26.0		13.0	13.0	13.0	20.0	20.0		31.0
Total Split (%)	28.9%	28.9%		28.9%	28.9%		14.4%	14.4%	14.4%	22.2%	22.2%		34%
Maximum Green (s)	21.0	21.0		21.0	21.0		8.0	8.0	8.0	15.0	15.0		29.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		0.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0		5.0	5.0			5.0	5.0		5.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	Max	Max		Max	Max		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													22.0
Pedestrian Calls (#/hr)													97
Act Effct Green (s)		22.0		22.0	22.0			8.4	8.4		13.8		
Actuated g/C Ratio		0.27		0.27	0.27			0.10	0.10		0.17		
v/c Ratio		0.23		0.02	0.50			0.73	0.13		0.83		
Control Delay		28.6		27.0	30.5			64.9	1.1		45.5		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		28.6		27.0	30.5			64.9	1.1		45.5		
LOS		C		C	C			E	A		D		
Approach Delay		28.6			30.4			52.0			45.5		
Approach LOS		C			C			D			D		
Queue Length 50th (ft)		38		3	120			76	0		114		
Queue Length 95th (ft)		62		12	156			#116	0		#253		
Internal Link Dist (ft)		280			651			221			275		
Turn Bay Length (ft)				100					100				
Base Capacity (vph)		701		328	921			184	255		394		
Starvation Cap Reductn		0		0	0			0	0		0		
Spillback Cap Reductn		0		0	0			0	0		0		
Storage Cap Reductn		0		0	0			0	0		0		
Reduced v/c Ratio		0.23		0.02	0.50			0.73	0.13		0.76		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 82.6
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 37.6 Intersection LOS: D
Intersection Capacity Utilization 54.1% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Washington Street & Florence Street

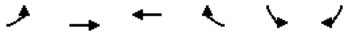




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	185	117	24	91	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	185	117	24	91	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.82	0.82	0.82	0.79	0.79	0.79	0.25	0.25	0.25
Hourly flow rate (vph)	0	0	0	0	226	143	30	115	0	0	0	0
Pedestrians		80									72	
Lane Width (ft)		0.0									0.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					363							
pX, platoon unblocked												
vC, conflicting volume	441			0			378	441	0	427	370	450
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	441			0			378	441	0	427	370	450
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			95	78	100	100	100	100
cM capacity (veh/h)	1130			1636			584	513	1091	448	563	614

Direction, Lane #	WB 1	NB 1
Volume Total	369	145
Volume Left	0	30
Volume Right	143	0
cSH	1700	527
Volume to Capacity	0.22	0.28
Queue Length 95th (ft)	0	28
Control Delay (s)	0.0	14.4
Lane LOS		B
Approach Delay (s)	0.0	14.4
Approach LOS		B

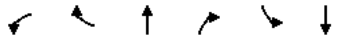
Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	31.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	164	370	51	77	22
Future Volume (Veh/h)	19	164	370	51	77	22
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.80	0.80	0.82	0.82
Hourly flow rate (vph)	20	171	463	64	94	27
Pedestrians		1	5		33	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	0		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		731	284			
pX, platoon unblocked						
vC, conflicting volume	560				658	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560				658	298
tC, single (s)	4.1				6.9	7.1
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	98				75	96
cM capacity (veh/h)	993				370	656

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	77	114	309	218	94	27
Volume Left	20	0	0	0	94	0
Volume Right	0	0	0	64	0	27
cSH	993	1700	1700	1700	370	656
Volume to Capacity	0.02	0.07	0.18	0.13	0.25	0.04
Queue Length 95th (ft)	2	0	0	0	25	3
Control Delay (s)	2.4	0.0	0.0	0.0	18.0	10.7
Lane LOS	A				C	B
Approach Delay (s)	1.0		0.0		16.4	
Approach LOS					C	

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	41	44	27	59	53
Future Volume (Veh/h)	10	41	44	27	59	53
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.76	0.76	0.85	0.85
Hourly flow rate (vph)	10	42	58	36	69	62
Pedestrians	11		17			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	304	89			105	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	304	89			105	
tC, single (s)	6.5	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.3			2.2	
p0 queue free %	98	96			95	
cM capacity (veh/h)	625	964			1460	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	52	94	131
Volume Left	10	0	69
Volume Right	42	36	0
cSH	873	1700	1460
Volume to Capacity	0.06	0.06	0.05
Queue Length 95th (ft)	5	0	4
Control Delay (s)	9.4	0.0	4.2
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	4.2
Approach LOS	A		

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		23.4%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	238	110	68	388	54	40
Future Volume (Veh/h)	238	110	68	388	54	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.75	0.75
Hourly flow rate (vph)	267	124	76	436	72	53
Pedestrians				21	60	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				2	5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			451		977	410
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			451		977	410
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		71	91
cM capacity (veh/h)			1064		247	597

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	391	512	125
Volume Left	0	76	72
Volume Right	124	0	53
cSH	1700	1064	329
Volume to Capacity	0.23	0.07	0.38
Queue Length 95th (ft)	0	6	43
Control Delay (s)	0.0	2.0	22.5
Lane LOS		A	C
Approach Delay (s)	0.0	2.0	22.5
Approach LOS			C

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	21	105	103	0	0
Future Volume (Veh/h)	0	21	105	103	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	23	114	112	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	170	170			226	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	170	170			226	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	820	874			1342	

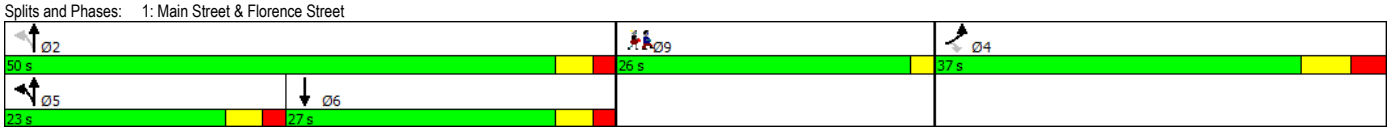
Direction, Lane #	WB 1	NB 1
Volume Total	23	226
Volume Left	0	0
Volume Right	23	112
cSH	874	1700
Volume to Capacity	0.03	0.13
Queue Length 95th (ft)	2	0
Control Delay (s)	9.2	0.0
Lane LOS	A	
Approach Delay (s)	9.2	0.0
Approach LOS	A	

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	21.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø2	Ø9
Lane Configurations								
Traffic Volume (vph)	124	284	210	305	330	81		
Future Volume (vph)	124	284	210	305	330	81		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	10	13	13	11		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor	0.95	0.96		1.00	0.99			
Frt		0.850			0.973			
Flt Protected	0.950			0.980				
Satd. Flow (prot)	1787	1599	0	1886	1860	0		
Flt Permitted	0.950			0.133				
Satd. Flow (perm)	1700	1529	0	255	1860	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)		334			10			
Link Speed (mph)	30			30	30			
Link Distance (ft)	284			528	324			
Travel Time (s)	6.5			12.0	7.4			
Confl. Peds. (#/hr)	26	13	34			34		
Peak Hour Factor	0.85	0.85	0.92	0.92	0.78	0.78		
Heavy Vehicles (%)	1%	1%	5%	0%	1%	3%		
Adj. Flow (vph)	146	334	228	332	423	104		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	146	334	0	560	527	0		
Turn Type	Prot	Perm	custom	NA	NA			
Protected Phases	4		5	2 5	6		2	9
Permitted Phases		4	2					
Detector Phase	4	4	5	2 5	6			
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0		4.0		16.0	4.0
Minimum Split (s)	15.0	15.0	13.0		9.0		21.0	26.0
Total Split (s)	37.0	37.0	23.0		27.0		50.0	26.0
Total Split (%)	32.7%	32.7%	20.4%		23.9%		44%	23%
Maximum Green (s)	30.0	30.0	18.0		22.0		45.0	24.0
Yellow Time (s)	4.0	4.0	3.0		3.0		3.0	2.0
All-Red Time (s)	3.0	3.0	2.0		2.0		2.0	0.0
Lost Time Adjust (s)	0.0	0.0			0.0			
Total Lost Time (s)	7.0	7.0			5.0			
Lead/Lag			Lead		Lag			
Lead-Lag Optimize?			Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0
Recall Mode	None	None	None		Max		Max	None
Walk Time (s)								6.0
Flash Dont Walk (s)								18.0
Pedestrian Calls (#/hr)								15
Act Effct Green (s)	12.3	12.3		46.3	22.6			
Actuated g/C Ratio	0.16	0.16		0.62	0.30			
v/c Ratio	0.50	0.63		1.00	0.92			
Control Delay	36.1	9.8		60.7	51.8			
Queue Delay	0.0	0.0		0.0	0.0			
Total Delay	36.1	9.8		60.7	51.8			
LOS	D	A		E	D			
Approach Delay	17.8			60.7	51.8			
Approach LOS	B			E	D			
Queue Length 50th (ft)	56	0		174	198			
Queue Length 95th (ft)	137	58		#661	#521			
Internal Link Dist (ft)	204			448	244			
Turn Bay Length (ft)								
Base Capacity (vph)	738	827		562	570			
Starvation Cap Reductn	0	0		0	0			
Spillback Cap Reductn	0	0		0	0			
Storage Cap Reductn	0	0		0	0			
Reduced v/c Ratio	0.20	0.40		1.00	0.92			

Intersection Summary			
Area Type:	Other		
Cycle Length: 113			
Actuated Cycle Length: 74.7			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 44.6		Intersection LOS: D	
Intersection Capacity Utilization 71.6%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Main Street & Florence Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	386	24	62	234	115	38	262	125	107	277	215
Future Volume (vph)	175	386	24	62	234	115	38	262	125	107	277	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	15	12	10	10	12	12	10	10	12	16	16
Storage Length (ft)	0		0	0		200	0		0	0		50
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	1.00		0.95	0.95			1.00	0.97		1.00	
Frt		0.991			0.951				0.850			0.850
Flt Protected	0.950			0.950				0.994			0.986	
Satd. Flow (prot)	1547	1968	0	1620	1549	0	0	1711	1492	0	2108	1777
Flt Permitted	0.950			0.512				0.740			0.586	
Satd. Flow (perm)	1423	1968	0	826	1549	0	0	1273	1443	0	1250	1777
Right Turn on Red			No			No			Yes			No
Satd. Flow (RTOR)									137			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		278			466			512			528	
Travel Time (s)		6.3			10.6			11.6			12.0	
Confl. Peds. (#/hr)	81		58	58		81	20		8	8		20
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.91	0.91	0.91	0.94	0.94	0.94
Heavy Vehicles (%)	5%	4%	18%	4%	5%	0%	3%	3%	1%	0%	1%	3%
Adj. Flow (vph)	184	406	25	68	257	126	42	288	137	114	295	229
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	431	0	68	383	0	0	330	137	0	409	229
Turn Type	Prot	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pt+ov
Protected Phases	5	2			6			8			4	4 5
Permitted Phases				6			8		8	4		
Detector Phase	5	2		6	6		8	8	8	4	4	5
Switch Phase												
Minimum Initial (s)	9.0	44.0		31.0	31.0		18.0	18.0	18.0	18.0	18.0	
Minimum Split (s)	14.0	49.0		36.0	36.0		36.0	36.0	36.0	36.0	36.0	
Total Split (s)	15.0	60.0		45.0	45.0		41.0	41.0	41.0	41.0	41.0	
Total Split (%)	14.9%	59.4%		44.6%	44.6%		40.6%	40.6%	40.6%	40.6%	40.6%	
Maximum Green (s)	10.0	55.0		40.0	40.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			6.0	6.0		6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None	None	None	None	
Walk Time (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Flash Dont Walk (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Pedestrian Calls (#/hr)				55	55		18	18	18	18	18	
Act Effct Green (s)	10.0	55.0		40.0	40.0			33.8	33.8		33.8	48.8
Actuated g/C Ratio	0.10	0.55		0.40	0.40			0.34	0.34		0.34	0.49
v/c Ratio	1.19	0.40		0.21	0.62			0.77	0.24		0.97	0.26
Control Delay	173.0	14.5		22.2	29.5			42.8	5.2		70.2	15.9
Queue Delay	0.0	10.9		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	173.0	25.4		22.2	29.5			42.8	5.2		70.2	15.9
LOS	F	C		C	C			D	A		E	B
Approach Delay		69.6			28.4			31.8			50.7	
Approach LOS		E			C			C			D	
Queue Length 50th (ft)	~145	153		28	195			186	0		253	82
Queue Length 95th (ft)	#281	224		61	297			#319	40		#445	131
Internal Link Dist (ft)		198			386			432			448	
Turn Bay Length (ft)												50
Base Capacity (vph)	155	1084		331	620			446	595		438	868
Starvation Cap Reductn	0	620		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	1.19	0.93		0.21	0.62			0.74	0.23		0.93	0.26

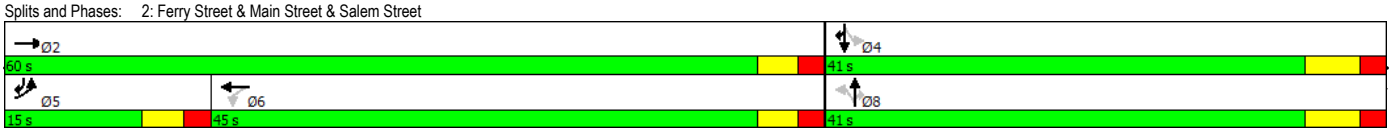
Intersection Summary

Area Type: Other
Cycle Length: 101
Actuated Cycle Length: 99.8
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 47.3 Intersection LOS: D
Intersection Capacity Utilization 121.5% ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Ferry Street & Main Street & Salem Street



Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR	Ø9
Lane Configurations								
Traffic Volume (vph)	0	0	140	587	10	346	134	
Future Volume (vph)	0	0	140	587	10	346	134	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00		0.99		
Frt						0.959		
Flt Protected				0.990		0.999		
Satd. Flow (prot)	0	0	0	3423	0	3278	0	
Flt Permitted				0.735		0.940		
Satd. Flow (perm)	0	0	0	2534	0	3084	0	
Right Turn on Red		Yes					Yes	
Satd. Flow (RTOR)						147		
Link Speed (mph)	30			30		30		
Link Distance (ft)	363			237		278		
Travel Time (s)	8.3			5.4		6.3		
Confl. Peds. (#/hr)			46				46	
Confl. Bikes (#/hr)							1	
Peak Hour Factor	0.25	0.25	0.95	0.95	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	0%	2%	5%	0%	5%	2%	
Adj. Flow (vph)	0	0	147	618	11	380	147	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	0	765	0	538	0	
Turn Type			Perm	NA	Perm	NA		
Protected Phases				2		6		9
Permitted Phases			2		6			
Detector Phase			2	2	6	6		
Switch Phase								
Minimum Initial (s)			10.0	10.0	10.0	10.0		4.0
Minimum Split (s)			20.0	20.0	20.0	20.0		19.0
Total Split (s)			84.0	84.0	84.0	84.0		19.0
Total Split (%)			81.6%	81.6%	81.6%	81.6%		18%
Maximum Green (s)			80.0	80.0	80.0	80.0		17.0
Yellow Time (s)			3.0	3.0	3.0	3.0		2.0
All-Red Time (s)			1.0	1.0	1.0	1.0		0.0
Lost Time Adjust (s)				0.0		0.0		
Total Lost Time (s)				4.0		4.0		
Lead/Lag								
Lead-Lag Optimize?								
Vehicle Extension (s)			3.0	3.0	3.0	3.0		3.0
Recall Mode			Max	Max	Max	Max		None
Walk Time (s)								11.0
Flash Dont Walk (s)								6.0
Pedestrian Calls (#/hr)								0
Act Effct Green (s)				99.0		99.0		
Actuated g/C Ratio				1.00		1.00		
v/c Ratio				0.30		0.17		
Control Delay				0.3		0.1		
Queue Delay				0.0		0.0		
Total Delay				0.3		0.1		
LOS				A		A		
Approach Delay				0.3		0.1		
Approach LOS				A		A		
Queue Length 50th (ft)				0		0		
Queue Length 95th (ft)				0		0		
Internal Link Dist (ft)	283			157		198		
Turn Bay Length (ft)								
Base Capacity (vph)				2534		3084		
Starvation Cap Reductn				0		0		
Spillback Cap Reductn				0		0		
Storage Cap Reductn				0		0		
Reduced v/c Ratio				0.30		0.17		

Intersection Summary			
Area Type:	Other		
Cycle Length: 103			
Actuated Cycle Length: 99			
Natural Cycle: 40			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 0.2		Intersection LOS: A	
Intersection Capacity Utilization 42.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Main Street & Pleasant Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	141	4	131	0	0	0	0	582	20	5	346	0	
Future Volume (vph)	141	4	131	0	0	0	0	582	20	5	346	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	16	12	12	12	12	12	12	12	12	11	12	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	
Ped Bike Factor	0.95	0.92						1.00			1.00		
Frt		0.854						0.995					
Flt Protected	0.950										0.999		
Satd. Flow (prot)	1805	1649	0	0	0	0	0	3421	0	0	3354	0	
Flt Permitted	0.950										0.949		
Satd. Flow (perm)	1716	1649	0	0	0	0	0	3421	0	0	3186	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		146						5					
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		234			280			219			237		
Travel Time (s)		5.3			6.4			5.0			5.4		
Confl. Peds. (#/hr)	31		45						29	29			
Confl. Bikes (#/hr)									3				
Peak Hour Factor	0.90	0.90	0.90	0.25	0.25	0.25	0.90	0.90	0.90	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	25%	2%	0%	0%	0%	0%	5%	0%	0%	4%	0%	
Adj. Flow (vph)	157	4	146	0	0	0	0	647	22	5	372	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	157	150	0	0	0	0	0	669	0	0	377	0	
Turn Type	Perm	NA						NA		Perm	NA		
Protected Phases		4						2			6		9
Permitted Phases	4									6			
Detector Phase	4	4						2		6	6		
Switch Phase													
Minimum Initial (s)	8.0	8.0						10.0		10.0	10.0		4.0
Minimum Split (s)	12.0	12.0						14.0		14.0	14.0		20.0
Total Split (s)	24.0	24.0						62.0		62.0	62.0		20.0
Total Split (%)	22.6%	22.6%						58.5%		58.5%	58.5%		19%
Maximum Green (s)	20.0	20.0						58.0		58.0	58.0		18.0
Yellow Time (s)	3.0	3.0						3.0		3.0	3.0		2.0
All-Red Time (s)	1.0	1.0						1.0		1.0	1.0		0.0
Lost Time Adjust (s)	0.0	0.0						0.0			0.0		
Total Lost Time (s)	4.0	4.0						4.0			4.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0		3.0
Recall Mode	None	None						Max		Max	Max		None
Walk Time (s)													4.0
Flash Dont Walk (s)													14.0
Pedestrian Calls (#/hr)													0
Act Effct Green (s)	12.6	12.6						58.1			58.1		
Actuated g/C Ratio	0.16	0.16						0.74			0.74		
v/c Ratio	0.58	0.39						0.26			0.16		
Control Delay	39.1	8.9						4.0			3.6		
Queue Delay	0.0	0.0						1.3			0.5		
Total Delay	39.1	8.9						5.3			4.1		
LOS	D	A						A			A		
Approach Delay		24.3						5.3			4.1		
Approach LOS		C						A			A		
Queue Length 50th (ft)	72	2						43			22		
Queue Length 95th (ft)	129	48						83			46		
Internal Link Dist (ft)		154			200			139			157		
Turn Bay Length (ft)													
Base Capacity (vph)	437	528						2527			2353		
Starvation Cap Reductn	0	0						1589			1527		
Spillback Cap Reductn	0	0						0			0		
Storage Cap Reductn	0	0						0			0		
Reduced v/c Ratio	0.36	0.28						0.71			0.46		

Intersection Summary			
Area Type:	Other		
Cycle Length: 106			
Actuated Cycle Length: 78.7			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 9.3		Intersection LOS: A	
Intersection Capacity Utilization 35.4%		ICU Level of Service A	
Analysis Period (min) 15			

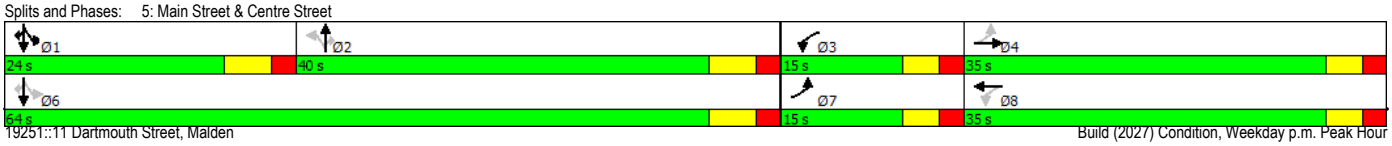
Splits and Phases: 4: Main Street & Exchange Street/Irving Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø6
Lane Configurations													
Traffic Volume (vph)	198	697	60	196	362	60	73	359	307	47	317	94	
Future Volume (vph)	198	697	60	196	362	60	73	359	307	47	317	94	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	12	11	12	12	12	12	12	12	12	12	
Storage Length (ft)	215		0	300		0	0		0	0		125	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.99	0.99		0.98	1.00		0.97		0.97	0.99		0.93	
Frt		0.988			0.979				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1560	3466	0	1711	3490	0	1719	1845	1568	1805	1845	1455	
Flt Permitted	0.361			0.138			0.554			0.339			
Satd. Flow (perm)	588	3466	0	244	3490	0	968	1845	1517	639	1845	1357	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)		8			16							102	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		255			718			281			219		
Travel Time (s)		5.8			16.3			6.4			5.0		
Confl. Peds. (#/hr)	11		37	37		11	54		19	19		54	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.96	0.96	0.96	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	8%	1%	13%	2%	1%	0%	5%	3%	3%	0%	3%	11%	
Adj. Flow (vph)	206	726	63	209	385	64	78	386	330	51	345	102	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	206	789	0	209	449	0	78	386	330	51	345	102	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	custom	NA	custom	
Protected Phases	7	4		3	8			2		1	1 6	1	6
Permitted Phases	4			8			2		2	6		6	
Detector Phase	7	4		3	8		2	2	2	1	6	1	
Switch Phase													
Minimum Initial (s)	4.0	10.0		4.0	10.0		8.0	8.0	8.0	4.0		4.0	8.0
Minimum Split (s)	9.0	27.0		9.0	27.0		39.0	39.0	39.0	10.0		10.0	39.0
Total Split (s)	15.0	35.0		15.0	35.0		40.0	40.0	40.0	24.0		24.0	64.0
Total Split (%)	13.2%	30.7%		13.2%	30.7%		35.1%	35.1%	35.1%	21.1%		21.1%	56%
Maximum Green (s)	10.0	30.0		10.0	30.0		34.0	34.0	34.0	18.0		18.0	58.0
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0	6.0	6.0		6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	None		None	Max
Walk Time (s)		5.0			5.0		5.0	5.0	5.0				5.0
Flash Dont Walk (s)		17.0			17.0		28.0	28.0	28.0				28.0
Pedestrian Calls (#/hr)		54			19		37	37	37				11
Act Effct Green (s)	38.9	28.9		38.9	28.9		44.9	44.9	44.9	58.0	58.0	58.0	
Actuated g/C Ratio	0.34	0.26		0.34	0.26		0.40	0.40	0.40	0.51	0.51	0.51	
v/c Ratio	0.72	0.88		0.98	0.50		0.20	0.53	0.55	0.13	0.36	0.14	
Control Delay	41.2	52.7		85.5	36.5		25.0	29.7	31.0	15.0	18.1	3.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	38.4	1.1	
Total Delay	41.2	52.7		85.5	36.5		25.0	29.7	31.0	15.0	56.5	4.4	
LOS	D	D		F	D		C	C	C	B	E	A	
Approach Delay		50.3			52.1			29.8			41.6		
Approach LOS		D			D			C			D		
Queue Length 50th (ft)	104	288		104	141		37	214	185	18	147	0	
Queue Length 95th (ft)	#178	#387		#260	193		76	318	286	39	216	27	
Internal Link Dist (ft)		175			638			201			139		
Turn Bay Length (ft)	215			300								125	
Base Capacity (vph)	288	927		214	939		385	733	603	514	947	762	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	616	492	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Reduced v/c Ratio	0.72	0.85		0.98	0.48		0.20	0.53	0.55	0.10	1.04	0.38	

Intersection Summary

Area Type: Other
Cycle Length: 114
Actuated Cycle Length: 112.9
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 43.7 Intersection LOS: D
Intersection Capacity Utilization 81.5% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Main Street & Centre Street

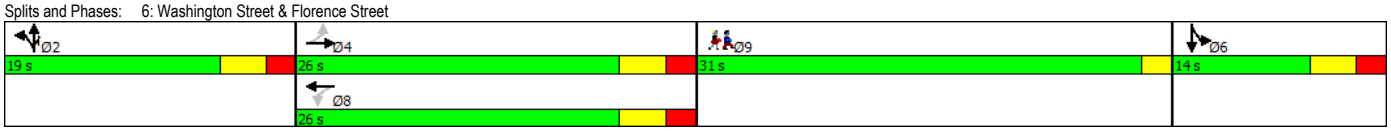


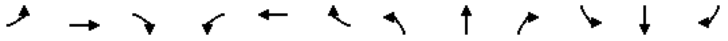
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø9
Lane Configurations													
Traffic Volume (vph)	65	209	3	1	203	29	69	49	41	54	8	64	
Future Volume (vph)	65	209	3	1	203	29	69	49	41	54	8	64	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	100		0	0		100	0		0	
Storage Lanes	0		0	1		0	0		1	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.998			0.981				0.850		0.932		
Flt Protected		0.988		0.950				0.972			0.979		
Satd. Flow (prot)	0	3444	0	1805	3393	0	0	1831	1568	0	1734	0	
Flt Permitted		0.816		0.572				0.972			0.979		
Satd. Flow (perm)	0	2844	0	1087	3393	0	0	1831	1568	0	1734	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		1			16				109		46		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		360			731			301			355		
Travel Time (s)		8.2			16.6			6.8			8.1		
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.88	0.88	0.88	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	4%	33%	0%	5%	0%	0%	2%	3%	0%	0%	0%	
Adj. Flow (vph)	69	222	3	1	233	33	78	56	47	58	9	69	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	294	0	1	266	0	0	134	47	0	136	0	
Turn Type	Perm	NA		Perm	NA		Split	NA	custom	Split	NA		
Protected Phases		4			8		2	2	2	6	6		9
Permitted Phases	4			8					2				
Detector Phase	4	4		8	8		2	2	2	6	6		
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		8.0	8.0	8.0	8.0	8.0		4.0
Minimum Split (s)	15.0	15.0		15.0	15.0		13.0	13.0	13.0	13.0	13.0		31.0
Total Split (s)	26.0	26.0		26.0	26.0		19.0	19.0	19.0	14.0	14.0		31.0
Total Split (%)	28.9%	28.9%		28.9%	28.9%		21.1%	21.1%	21.1%	15.6%	15.6%		34%
Maximum Green (s)	21.0	21.0		21.0	21.0		14.0	14.0	14.0	9.0	9.0		29.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0		0.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0		0.0		
Total Lost Time (s)		5.0		5.0	5.0			5.0	5.0		5.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	Max	Max		Max	Max		None	None	None	None	None		None
Walk Time (s)													7.0
Flash Dont Walk (s)													22.0
Pedestrian Calls (#/hr)													100
Act Effct Green (s)		30.1		30.1	30.1			12.3	12.3		9.9		
Actuated g/C Ratio		0.39		0.39	0.39			0.16	0.16		0.13		
v/c Ratio		0.26		0.00	0.20			0.46	0.14		0.52		
Control Delay		28.0		26.0	25.6			41.1	0.9		35.5		
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0		
Total Delay		28.0		26.0	25.6			41.1	0.9		35.5		
LOS		C		C	C			D	A		D		
Approach Delay		28.0			25.7			30.6			35.5		
Approach LOS		C			C			C			D		
Queue Length 50th (ft)		72		0	60			70	0		48		
Queue Length 95th (ft)		114		4	93			124	0		#122		
Internal Link Dist (ft)		280			651			221			275		
Turn Bay Length (ft)				100					100				
Base Capacity (vph)		1112		424	1336			386	417		275		
Starvation Cap Reductn		0		0	0			0	0		0		
Spillback Cap Reductn		0		0	0			0	0		0		
Storage Cap Reductn		0		0	0			0	0		0		
Reduced v/c Ratio		0.26		0.00	0.20			0.35	0.11		0.49		

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 77.1
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 29.0 Intersection LOS: C
Intersection Capacity Utilization 43.2% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Washington Street & Florence Street

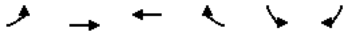




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	184	93	57	75	0	0	0	0
Future Volume (Veh/h)	0	0	0	0	184	93	57	75	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.91	0.91	0.91	0.87	0.87	0.87	0.25	0.25	0.25
Hourly flow rate (vph)	0	0	0	0	202	102	66	86	0	0	0	0
Pedestrians		109									98	
Lane Width (ft)		0.0									0.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					363							
pX, platoon unblocked												
vC, conflicting volume	402			0			362	402	0	394	351	460
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	402			0			362	402	0	394	351	460
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			89	84	100	100	100	100
cM capacity (veh/h)	1168			1636			598	537	1091	499	577	605

Direction, Lane #	WB 1	NB 1
Volume Total	304	152
Volume Left	0	66
Volume Right	102	0
cSH	1700	562
Volume to Capacity	0.18	0.27
Queue Length 95th (ft)	0	27
Control Delay (s)	0.0	13.8
Lane LOS		B
Approach Delay (s)	0.0	13.8
Approach LOS		B

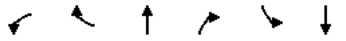
Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	31.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	267	192	53	154	39
Future Volume (Veh/h)	24	267	192	53	154	39
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	26	293	221	61	177	45
Pedestrians		2	11		37	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	1		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		731	284			
pX, platoon unblocked						
vC, conflicting volume	319				498	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	319				498	180
tC, single (s)	4.2				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				63	94
cM capacity (veh/h)	1186				476	811

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	124	195	147	135	177	45
Volume Left	26	0	0	0	177	0
Volume Right	0	0	0	61	0	45
cSH	1186	1700	1700	1700	476	811
Volume to Capacity	0.02	0.11	0.09	0.08	0.37	0.06
Queue Length 95th (ft)	2	0	0	0	43	4
Control Delay (s)	1.9	0.0	0.0	0.0	17.0	9.7
Lane LOS	A				C	A
Approach Delay (s)	0.7		0.0		15.5	
Approach LOS					C	

Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	38.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	61	92	94	56	36
Future Volume (Veh/h)	4	61	92	94	56	36
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	4	69	107	109	71	46
Pedestrians	13		2			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	364	178			229	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	364	178			229	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	92			95	
cM capacity (veh/h)	597	852			1336	

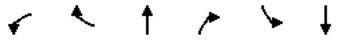
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	73	216	117
Volume Left	4	0	71
Volume Right	69	109	0
cSH	833	1700	1336
Volume to Capacity	0.09	0.13	0.05
Queue Length 95th (ft)	7	0	4
Control Delay (s)	9.7	0.0	4.9
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	4.9
Approach LOS	A		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	280	81	58	195	95	102
Future Volume (Veh/h)	280	81	58	195	95	102
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	322	93	65	219	120	129
Pedestrians	1			16	62	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			1	5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			477		780	446
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			477		780	446
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			94		63	77
cM capacity (veh/h)			1010		322	567

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	415	284	249
Volume Left	0	65	120
Volume Right	93	0	129
cSH	1700	1010	415
Volume to Capacity	0.24	0.06	0.60
Queue Length 95th (ft)	0	5	95
Control Delay (s)	0.0	2.5	25.9
Lane LOS		A	D
Approach Delay (s)	0.0	2.5	25.9
Approach LOS			D

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	103	143	25	0	0
Future Volume (Veh/h)	0	103	143	25	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	112	155	27	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	168	168			182	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	168	168			182	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	87			100	
cM capacity (veh/h)	822	876			1393	

Direction, Lane #	WB 1	NB 1
Volume Total	112	182
Volume Left	0	0
Volume Right	112	27
cSH	876	1700
Volume to Capacity	0.13	0.11
Queue Length 95th (ft)	11	0
Control Delay (s)	9.7	0.0
Lane LOS	A	
Approach Delay (s)	9.7	0.0
Approach LOS	A	

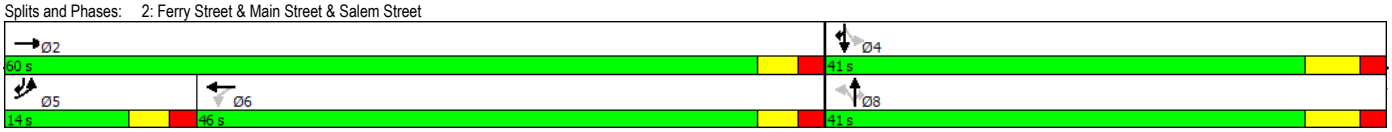
Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	22.1%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	235	25	88	293	198	55	241	132	111	185	245
Future Volume (vph)	123	235	25	88	293	198	55	241	132	111	185	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	15	12	10	10	12	12	10	10	12	16	16
Storage Length (ft)	0		0	0		200	0		0	0		50
Storage Lanes	1		0	1		1	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	0.98		0.80	0.92			1.00	0.79		0.96	
Frt		0.985			0.940				0.850			0.850
Flt Protected	0.950			0.950				0.991			0.982	
Satd. Flow (prot)	1438	1856	0	1668	1483	0	0	1737	1492	0	2058	1812
Flt Permitted	0.950			0.562				0.713			0.515	
Satd. Flow (perm)	1316	1856	0	786	1483	0	0	1246	1172	0	1039	1812
Right Turn on Red			No			No			Yes			No
Satd. Flow (RTOR)									159			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		278			466			512			528	
Travel Time (s)		6.3			10.6			11.6			12.0	
Confl. Peds. (#/hr)	108		191	191		108	33		118	118		33
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.79	0.79	0.79	0.89	0.89	0.89	0.83	0.83	0.83	0.84	0.84	0.84
Heavy Vehicles (%)	13%	8%	17%	1%	5%	1%	2%	1%	1%	4%	2%	1%
Adj. Flow (vph)	156	297	32	99	329	222	66	290	159	132	220	292
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	329	0	99	551	0	0	356	159	0	352	292
Turn Type	Prot	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pt+ov
Protected Phases	5	2			6			8			4	4 5
Permitted Phases				6			8		8	4		
Detector Phase	5	2		6	6		8	8	8	4	4	5
Switch Phase												
Minimum Initial (s)	9.0	44.0		31.0	31.0		18.0	18.0	18.0	18.0	18.0	
Minimum Split (s)	14.0	49.0		36.0	36.0		36.0	36.0	36.0	36.0	36.0	
Total Split (s)	14.0	60.0		46.0	46.0		41.0	41.0	41.0	41.0	41.0	
Total Split (%)	13.9%	59.4%		45.5%	45.5%		40.6%	40.6%	40.6%	40.6%	40.6%	
Maximum Green (s)	9.0	55.0		41.0	41.0		35.0	35.0	35.0	35.0	35.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			6.0	6.0		6.0	
Lead/Lag	Lead			Lag	Lag							
Lead-Lag Optimize?	Yes			Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		Max	Max		None	None	None	None	None	
Walk Time (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Flash Dont Walk (s)				15.0	15.0		15.0	15.0	15.0	15.0	15.0	
Pedestrian Calls (#/hr)				55	55		18	18	18	18	18	
Act Effct Green (s)	9.0	55.0		41.0	41.0			35.0	35.0		35.0	49.0
Actuated g/C Ratio	0.09	0.54		0.41	0.41			0.35	0.35		0.35	0.49
v/c Ratio	1.22	0.33		0.31	0.92			0.83	0.31		0.98	0.33
Control Delay	190.6	13.9		23.8	50.7			48.1	5.6		76.7	17.3
Queue Delay	0.0	5.3		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	190.6	19.2		23.8	50.7			48.1	5.6		76.7	17.3
LOS	F	B		C	D			D	A		E	B
Approach Delay		74.3			46.6			35.0			49.8	
Approach LOS		E			D			C			D	
Queue Length 50th (ft)	~124	111		43	329			208	0		222	111
Queue Length 95th (ft)	#210	142		84	#532			#314	34		#364	157
Internal Link Dist (ft)		198			386			432			448	
Turn Bay Length (ft)												50
Base Capacity (vph)	128	1010		319	602			431	510		360	879
Starvation Cap Reductn	0	607		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	1.22	0.82		0.31	0.92			0.83	0.31		0.98	0.33

Intersection Summary			
Area Type:	Other		
Cycle Length: 101			
Actuated Cycle Length: 101			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.22			
Intersection Signal Delay: 50.8		Intersection LOS: D	
Intersection Capacity Utilization 127.6%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Ferry Street & Main Street & Salem Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø6
Lane Configurations													
Traffic Volume (vph)	92	390	53	341	661	57	115	306	144	34	328	99	
Future Volume (vph)	92	390	53	341	661	57	115	306	144	34	328	99	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	12	11	12	12	12	12	12	12	12	12	
Storage Length (ft)	215		0	300		0	0		0	0		75	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	1.00	0.99		0.99	1.00		0.98		0.96	0.99		0.96	
Frt		0.982			0.988				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1337	3263	0	1694	3483	0	1770	1792	1538	1736	1863	1468	
Flt Permitted	0.141			0.281			0.546			0.337			
Satd. Flow (perm)	198	3263	0	495	3483	0	1000	1792	1473	608	1863	1408	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)		13			8							79	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		255			718			281			219		
Travel Time (s)		5.8			16.3			6.4			5.0		
Confl. Peds. (#/hr)	12		13	13		12	27		30	30		27	
Confl. Bikes (#/hr)						1						3	
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90	0.76	0.76	0.76	0.91	0.91	0.91	
Heavy Vehicles (%)	26%	7%	15%	3%	2%	4%	2%	6%	5%	4%	2%	10%	
Adj. Flow (vph)	111	470	64	379	734	63	151	403	189	37	360	109	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	111	534	0	379	797	0	151	403	189	37	360	109	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	custom	NA	custom	
Protected Phases	7	4		3	8			2		1	1 6	1	6
Permitted Phases	4			8			2		2	6		6	
Detector Phase	7	4		3	8		2	2	2	1	6	1	
Switch Phase													
Minimum Initial (s)	4.0	10.0		4.0	10.0		8.0	8.0	8.0	4.0		4.0	8.0
Minimum Split (s)	9.0	27.0		9.0	27.0		39.0	39.0	39.0	10.0		10.0	39.0
Total Split (s)	15.0	35.0		15.0	35.0		40.0	40.0	40.0	24.0		24.0	64.0
Total Split (%)	13.2%	30.7%		13.2%	30.7%		35.1%	35.1%	35.1%	21.1%		21.1%	56%
Maximum Green (s)	10.0	30.0		10.0	30.0		34.0	34.0	34.0	19.0		19.0	58.0
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	3.0		3.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0	6.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	None		None	Max
Walk Time (s)		5.0			5.0		5.0	5.0	5.0				5.0
Flash Dont Walk (s)		17.0			17.0		28.0	28.0	28.0				28.0
Pedestrian Calls (#/hr)		54			19		37	37	37				11
Act Effct Green (s)	37.9	28.4		38.8	28.8		45.8	45.8	45.8	59.0	59.0	59.0	
Actuated g/C Ratio	0.34	0.25		0.35	0.26		0.41	0.41	0.41	0.52	0.52	0.52	
v/c Ratio	0.68	0.64		1.37	0.89		0.37	0.55	0.32	0.09	0.37	0.14	
Control Delay	45.3	40.4		214.8	52.8		27.7	29.9	25.5	14.2	17.5	5.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	35.4	1.3	
Total Delay	45.3	40.4		214.8	52.8		27.7	29.9	25.5	14.2	52.9	6.8	
LOS	D	D		F	D		C	C	C	B	D	A	
Approach Delay		41.3			105.0			28.3			40.1		
Approach LOS		D			F			C			D		
Queue Length 50th (ft)	53	177		~262	291		76	223	93	13	152	10	
Queue Length 95th (ft)	#94	213		#459	#392		113	269	129	30	221	39	
Internal Link Dist (ft)		175			638			201			139		
Turn Bay Length (ft)	215			300								75	
Base Capacity (vph)	169	881		277	935		407	730	600	509	978	786	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	630	521	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Reduced v/c Ratio	0.66	0.61		1.37	0.85		0.37	0.55	0.32	0.07	1.03	0.41	

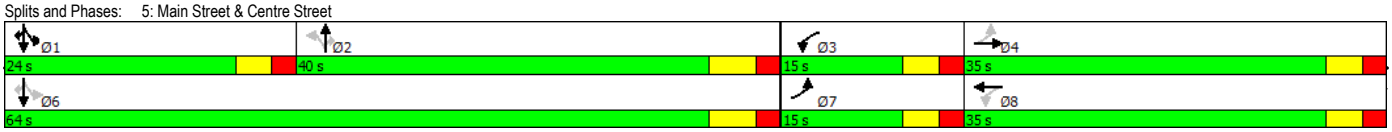
Intersection Summary

Area Type: Other
Cycle Length: 114
Actuated Cycle Length: 112.4
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.37
Intersection Signal Delay: 62.4 Intersection LOS: E
Intersection Capacity Utilization 81.9% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Main Street & Centre Street

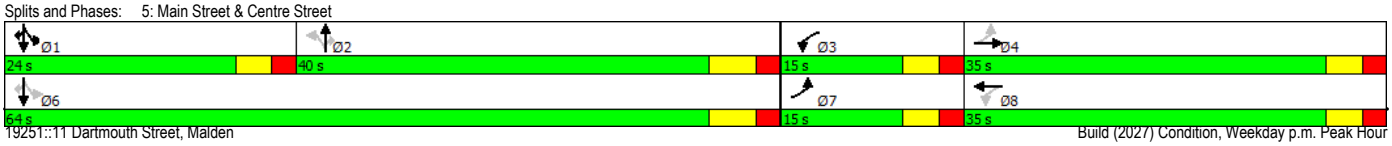


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø6
Lane Configurations													
Traffic Volume (vph)	198	697	60	196	362	60	73	359	307	47	317	94	
Future Volume (vph)	198	697	60	196	362	60	73	359	307	47	317	94	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	12	11	12	12	12	12	12	12	12	12	
Storage Length (ft)	215		0	300		0	0		0	0		125	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.99	0.99		0.98	1.00		0.97		0.97	0.99		0.93	
Frt		0.988			0.979				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1560	3466	0	1711	3490	0	1719	1845	1568	1805	1845	1455	
Flt Permitted	0.361			0.138			0.554			0.353			
Satd. Flow (perm)	588	3466	0	244	3490	0	968	1845	1517	665	1845	1357	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)		8			16							102	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		255			718			281			219		
Travel Time (s)		5.8			16.3			6.4			5.0		
Confl. Peds. (#/hr)	11		37	37		11	54		19	19		54	
Confl. Bikes (#/hr)			1						2			1	
Peak Hour Factor	0.96	0.96	0.96	0.94	0.94	0.94	0.93	0.93	0.93	0.92	0.92	0.92	
Heavy Vehicles (%)	8%	1%	13%	2%	1%	0%	5%	3%	3%	0%	3%	11%	
Adj. Flow (vph)	206	726	63	209	385	64	78	386	330	51	345	102	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	206	789	0	209	449	0	78	386	330	51	345	102	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	custom	NA	custom	
Protected Phases	7	4		3	8			2		1	1 6	1	6
Permitted Phases	4			8			2		2	6		6	
Detector Phase	7	4		3	8		2	2	2	1	6	1	
Switch Phase													
Minimum Initial (s)	4.0	10.0		4.0	10.0		8.0	8.0	8.0	4.0		4.0	8.0
Minimum Split (s)	9.0	27.0		9.0	27.0		39.0	39.0	39.0	10.0		10.0	39.0
Total Split (s)	15.0	35.0		15.0	35.0		40.0	40.0	40.0	24.0		24.0	64.0
Total Split (%)	13.2%	30.7%		13.2%	30.7%		35.1%	35.1%	35.1%	21.1%		21.1%	56%
Maximum Green (s)	10.0	30.0		10.0	30.0		34.0	34.0	34.0	19.0		19.0	58.0
Yellow Time (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	3.0		3.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		6.0	6.0	6.0	5.0		5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	None		None	Max
Walk Time (s)		5.0			5.0		5.0	5.0	5.0				5.0
Flash Dont Walk (s)		17.0			17.0		28.0	28.0	28.0				28.0
Pedestrian Calls (#/hr)		54			19		37	37	37				11
Act Effct Green (s)	38.9	28.9		38.9	28.9		46.0	46.0	46.0	59.0	59.0	59.0	
Actuated g/C Ratio	0.34	0.26		0.34	0.26		0.41	0.41	0.41	0.52	0.52	0.52	
v/c Ratio	0.72	0.88		0.98	0.50		0.20	0.51	0.53	0.12	0.36	0.13	
Control Delay	41.2	52.7		85.5	36.5		24.2	28.7	29.9	14.4	17.4	3.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	33.6	1.1	
Total Delay	41.2	52.7		85.5	36.5		24.2	28.7	29.9	14.4	51.0	4.3	
LOS	D	D		F	D		C	C	C	B	D	A	
Approach Delay		50.3			52.1			28.8			37.7		
Approach LOS		D			D			C			D		
Queue Length 50th (ft)	104	288		104	141		37	210	182	18	144	0	
Queue Length 95th (ft)	#178	#387		#260	193		75	312	281	38	212	27	
Internal Link Dist (ft)		175			638			201			139		
Turn Bay Length (ft)	215			300								125	
Base Capacity (vph)	288	927		214	939		394	751	617	539	964	774	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	628	503	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0	
Reduced v/c Ratio	0.72	0.85		0.98	0.48		0.20	0.51	0.53	0.09	1.03	0.38	

Intersection Summary

Area Type: Other
Cycle Length: 114
Actuated Cycle Length: 112.9
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 42.8 Intersection LOS: D
Intersection Capacity Utilization 80.6% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Main Street & Centre Street



HOWARD STEIN HUDSON

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Section 4.
Stormwater Management Report

PROVIDED UNDER SEPARATE COVER

HOWARD STEIN HUDSON

Engineers + Planners

STORMWATER MANAGEMENT REPORT

11 Dartmouth Street

Malden, Massachusetts

Prepared for

Quaker Lane Capital
200 Portland Street
Boston, MA 02114

Prepared by

Howard Stein Hudson
11 Beacon Street, Suite 1010
Boston, MA 02108
617-482-7080

March 25, 2020

Table of Contents

List of Tables

Appendices

Introduction

This Stormwater Management Report describes the existing drainage conditions and proposed stormwater best management practices (BMPs) designed to treat and control runoff for the proposed improvements at 11 Dartmouth Street, Malden, MA (the Site).

The Project Site includes two parcels and one common way. The Site is bordered by Dartmouth Street to the west, residential building - 480 Main Street to the north and northeast, 440-446 Main Street to the west, 15 23 Pleasant Street is located to the south and southeast and 31 37 Pleasant Street to the southwest. The entire site currently is covered with impervious surfaces – roof or pavement.

The proposed construction will disturb approximately ± 29,485 SF / 0.68 Acres of land. All this area is currently developed. The proposed site design does not disturb any previously undisturbed areas.

The approach to stormwater management for this project is to balance the needs of the project while preserving the integrity of the groundwater aquifer. The impervious surfaces of the existing site generate runoff that flows untreated into the culvert that conveys Spot Pond Brook. The proposed stormwater management design incorporates Best Management Practices (BMPs), as described in the Massachusetts Stormwater Handbook. These practices include structural and non-structural measures providing stormwater quantity and quality management.

The Project will not result in any change in impervious areas on site. Stormwater BMPs will be constructed to improve the water quality of runoff from all paved areas. Stormwater BMPs include deep sump catch basins, water quality unit and a subsurface infiltration systems. The infiltration systems will capture and help reduce pollutant concentrations in the stormwater runoff, help recharge the aquifer and will maintain or reduce peak stormwater discharge rates released off-site.

Pre and post-construction hydrology were analyzed with HydroCAD v 10.0, model using TR-20 methodology. The rainfall data was obtained from the Cornell University Atlas of Precipitation Extremes for Northeastern United States & Southeastern Canada. The result of this analysis shows there will be no increase in the overall peak discharge rates & volumes in the pre- and post-development conditions for the 2, 10, & 100-year storm events analyzed. The pre- and post-development peak discharge rates are included in Table 1. The project is designed to be in compliance with the Massachusetts Department of Environmental Protection's Stormwater Management Policy for Redevelopment. Soils at the site are mapped as 603 Urban Land. The map is included in Appendix A. A geotechnical report was prepared by GZA GeoEngironmental, Inc. and revealed that the soils underlaying the urban fill consist of sand and gravel. Excerpts from the report are provided in Appendix A (full body of geotechnical report is available upon request).

Hydrology

PRE-CONSTRUCTION HYDROLOGY

In the pre-development conditions of the site, the hydrology calculations analyze one (1) Watershed Area (WS) that discharges to one design point – the culvert that conveys the waters of Spot Pond Brook along the eastern property line.

POST-CONSTRUCTION HYDROLOGY

In the post-development conditions of the site, the hydrology calculations analyze two (2) Watershed Areas (WS) that ultimately discharge to the same design point – the culvert that conveys the waters of Spot Pond Brook along the eastern property line.

Best Management Practices (BMPs) to control and treat stormwater runoff include deep sump catch basins, water quality unit and a subsurface infiltration systems. These BMPs will improve the quality of stormwater runoff and reduce the peak flows off site to or below the pre-development levels for the 10-year and 100-year storms.

The proposed drainage design is shown on the plan entitled "Drainage and Utility Plan" submitted as part of this Special Permit package. The proposed project site was divided into two (2) watershed areas (WS). These WS areas are shown on the plan entitled "Proposed Watershed Plan" provided in Appendix C. Ultimately the runoff generated by the impervious surfaces of the proposed site is conveyed to the same design point as the runoff generated by the impervious surfaces of the pre-development site – the culvert that conveys the waters of Spot Pond Brook along the eastern property line..

WS 1 includes the roof of the proposed building. Runoff generated by this area reaches infiltration system 1 via downspouts.

WS 2 includes the paved service areas. Runoff generated by this area is collected in catch basins, sent to a water quality unit, the treated flow fills the concrete chambers of an underground infiltration system. The overflow from the infiltration system joins the overflow from infiltration system 1, fills an outlet control structure to the top of the weir and after water quality improvements and peak flow attenuation the water is released in a controlled manner into the culvert that conveys the waters of Spot Pond Brook along the eastern property line.

Stormwater Management Standards

STANDARD 1: NO NEW UNTREATED DISCHARGES

The Massachusetts Stormwater Handbook requires that the project demonstrates that there are no new untreated discharges and that new discharges will not cause erosion or scour to downstream wetlands.

Runoff from the paved areas will be directed to the stormwater collection system consisting of deep sump catch basins and water quality unit and released into the culvert that conveys the waters of Spot Pond Brook in a manner similar to the predevelopment conditions. There are no new untreated discharges on site that would cause erosion or scour to the downstream wetlands.

STANDARD 2: POST-DEVELOPMENT PEAK DISCHARGE RATES NOT TO EXCEED PRE-DEVELOPMENT PEAK DISCHARGE RATES

For the 10 and 100- year storm events the peak flows for the design point are less than the pre-development peak rates. There will be no flooding effect at downstream locations for the 100yr storm event. The impervious areas on site will remain the same pre and post development as shown in Table 1.

Table 1. Pre- Vs Post-Development Impervious Areas

Design Point	Pre-Development Area (SF)	Post-Development Area (SF)
Impervious Area	29,485	29,485 SF

In the predevelopment conditions runoff reaches Spot Pond Brook through the CB located in the northeast corner of the site or is collected in two connected drainage structures. In the post development conditions we propose two underground stormwater infiltrations systems with an overflow to Spot Pond Brook to accept the runoff generated by Watershed 1 and Water Quality Unit to treat the runoff generated by Watershed 2 prior to infiltration and overflow to Spot Pond Brook. Design strives to maintain the post development peak discharge runoff rates at or below pre development levels as summarized in Table 2. Detailed stormwater calculations included in Attachment B – Pre-Construction Hydrology and Attachment C – Post-Construction Hydrology.

Table 2. Pre-Development vs Post-Development Peak Discharge Rates

Design Point	Pre-Development Rate (cfs)	Post-Development Rate (cfs)
2-Year Storm Event: DP # 1 Farley Brook	**2.10**	2.06
10-Year Storm Event: DP # 1 Farley Brook	3.04	3.00
100-Year Storm Event: DP # 1 Farley Brook	**4.38**	**4.34**

STANDARD 3: MINIMIZE OR ELIMINATE LOSS OF ANNUAL RECHARGE TO GROUNDWATER

The project is a redevelopment and is required to meet Standard 3 to the maximum extent practicable. Stormwater infiltration practices are being proposed on site, where no infiltration existed in the predevelopment conditions (see Drainage and Utility Plan in Appendix H).

Soils at the site are mapped as 603 Urban Land by Natural Resource Conservation Service (NRCS). During the preliminary geotechnical investigation, it was revealed that the soils underlaying the urban fill consist of sand and gravel - Hydrologic Soil Group A. The maps are included in Appendix A.

Recharge Volume Target calculations are summarized in Table 3.

Table 3. Recharge Volume Target

Inches of Runoff x Total Impervious Area / 12 = Recharge Volume Target [cf]			
Hydrologic Group	Inches of Runoff	Impervious Area	Recharge Volume Target
A	0.60 in	29,485 SF	1,474 CF
B	0.35 in		
C	0.25 in		
D	0.10 in		
Recharge Volume Target			1,474 CF

The volume provided for recharge into the aquifer via exfiltration was calculated based on the "Static" method as follows (Calculations included in Appendix D).

- Storage volume in Infiltration Galley = 1,530 CF

Total Recharge Volume Provided = 1,530 CF > 1,474 CF (recharge volume target)

BMPs on site provide sufficient groundwater recharge to meet the requirements of Standard 3.

Calculations show that during a 100-year storm event the infiltration structures will completely dewater in the following time frame:

- Infiltration System 1 dewaters within - 32.0 **hours**
- Infiltration System 2 dewaters within - **30.0 hours**

Dewatering will happen faster than the maximum 72-hour window prescribed by the Stormwater Regulations. Drawdown calculations are included in Appendix D

STANDARD 4: STORMWATER MANAGEMENT SYSTEM TO REMOVE 80% OF AVERAGE ANNUAL LOAD OF TOTAL SUSPENDED SOLIDS (TSS)

The Massachusetts Stormwater Handbook requires that: "Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS)." If the site discharges runoff into a critical area Zone I or II the runoff would also have to be pre-treated to a level where 44% of the TSS have been removed prior to reaching the infiltration structure.

The Site is not discharging into a critical area. The project site features two treatment trains:

The clean roof runoff generated by Watershed 1 reaches the infiltration system via downspouts that are connected to a collector pipe flowing into Infiltration System 1. The roof runoff will not contain TSS and will not need to be treated prior to reaching the infiltration structure.

The runoff generated by Watershed 2 that includes paved surfaces will be collected in a system of deep sump catch basins and will be treated in a water quality unit prior to filling the infiltration galleys. For this treatment train the runoff is treated to the maximum extent practicable.

Overflow from both infiltration systems will be conveyed through an Outflow Control Structure (OCS) and sent to an existing drainage manhole and released into the Spot Pond Brook culvert.

The required Water Quality Volume - the volume of water requiring 80% TSS removal, is calculated as follows:

The required water quality volume equals 0.5 inch of runoff times the total impervious area of the post-development site. The analysis is conducted based on 0.5-inch runoff over the proposed impervious surfaces based on the absence of a critical areas downstream from the site.

Total proposed impervious area = 29,485 SF
0.5 in. x 29,485 sf ÷ 12 in. = 1,230 cubic feet Water Quality Volume required
(WQV treatment required = 80% TSS Removal)

TSS calculations for the treatment train described included in Appendix D.

STANDARD 5: LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS

The development is not considered a land use that generally produces higher potential pollutant loads.

STANDARD 6: STORMWATER DISCHARGES TO CRITICAL AREAS

The site is not in the vicinity of public well or critical area (see Attachment I).

STANDARD 7: REDEVELOPMENT PROJECTS

Portions of the site are considered redevelopment. Currently part of the runoff flows through a grate, directly into the Spot Pond Brook Culvert and another portion of the runoff generated by the site is collected in non-hooded catch basins and released untreated into the Spot Pond Brook Culvert. The project will employ a new stormwater management system that will include deep sump catch basins, an infiltration system and water quality treatment unit that will provide TSS removal prior to discharging the water into Spot Pond Brook.

"Site Preparation Plan" included in the project plans shows the location and BMPs that will be used during the construction process to protect neighboring properties and receiving drainage structures. A more detailed Stormwater Pollution Prevention Plan will be developed for this project once a construction contractor has been selected. This Plan will detail all of the practices and safeguards to be implemented in this project to control source pollution and stormwater effects during construction.

STANDARD 8: CONTROL CONSTRUCTION-RELATED IMPACTS

The project will install erosion and sediment controls prior to any major earthwork activity. Additionally, the Contractor will be required to prepare a Stormwater Pollution Prevention Plan. The contractor will also adhere closely to all standards and special conditions contained in the Special Permit issued by the City prior to any site altering activity and for the duration of construction.

STANDARD 9: LONG-TERM OPERATION AND MAINTENANCE PLAN

See Appendix E for the operation and maintenance requirements of the stormwater management system.

STANDARD 10: NO ILLICIT DISCHARGES

No illicit discharges shall be made, and a compliance statement is provided with the Stormwater Report as required by the Stormwater Management Handbook. The Illicit discharge compliance statement is provided in Appendix G.

Appendix A:
Soil Information

Soil Map—Middlesex County, Massachusetts
(11 Dartmouth Street, Malden)

Map Scale: 1:1,230 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 19, Sep 12, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2019—Oct 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
603	Urban land, wet substratum	7.4	100.0%
Totals for Area of Interest		**7.4**	**100.0%**

Middlesex County, Massachusetts

603—Urban land, wet substratum

Map Unit Setting

National map unit symbol: 9951
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land over alluvium and/or marine deposits

Minor Components

Udorthents, loamy

Percent of map unit: 10 percent
Hydric soil rating: No

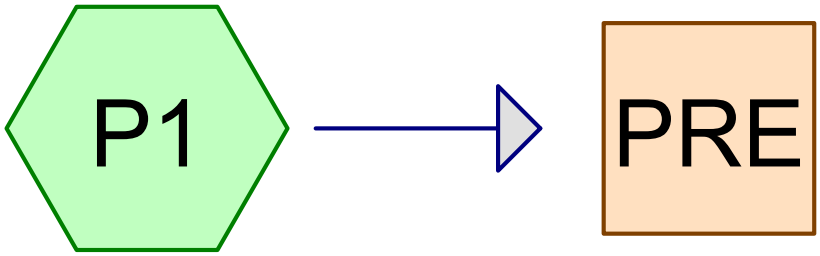
Rock outcrop

Percent of map unit: 5 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 19, Sep 12, 2019

Appendix B:
Pre-Construction Hydrology



Pre Dev Site Spot Pond Brook

Subcat Reach Pond Link

Routing Diagram for 19251 Pre & Post
Prepared by Howard Stein Hudson, Printed 10/9/2020

Summary for Subcatchment P1: Pre Dev Site

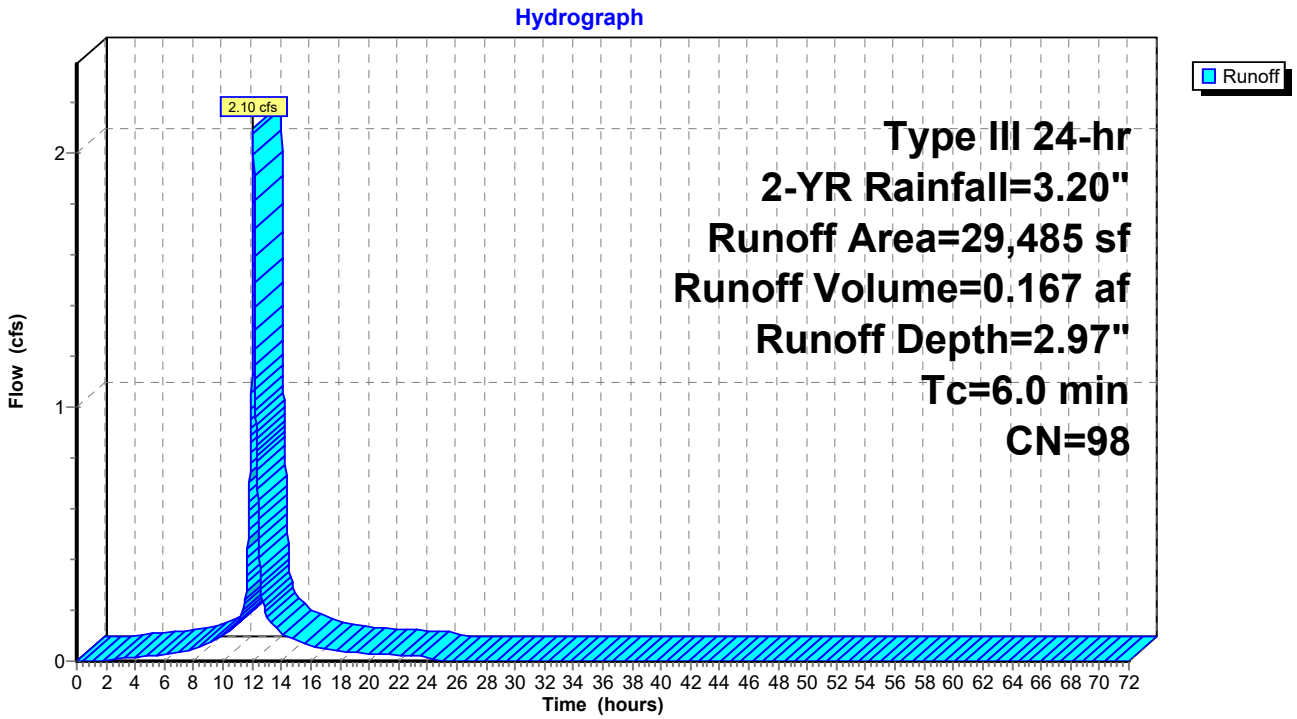
Runoff = 2.10 cfs @ 12.08 hrs, Volume= 0.167 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.20"

Area (sf)	CN	Description
5,705	98	Roofs, HSG C
23,780	98	Paved parking, HSG C
29,485	98	Weighted Average
29,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P1: Pre Dev Site

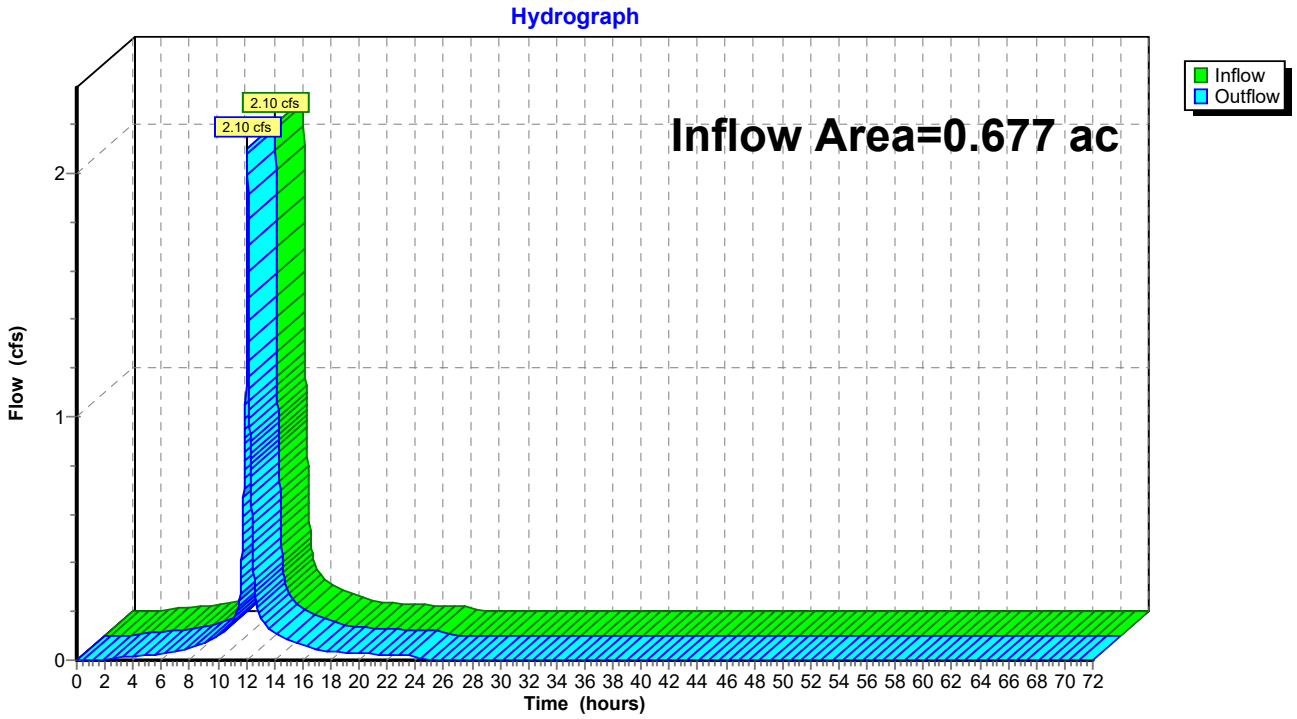


Summary for Reach PRE: Spot Pond Brook

Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 2.97" for 2-YR event
Inflow = 2.10 cfs @ 12.08 hrs, Volume= 0.167 af
Outflow = 2.10 cfs @ 12.08 hrs, Volume= 0.167 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach PRE: Spot Pond Brook



Summary for Subcatchment P1: Pre Dev Site

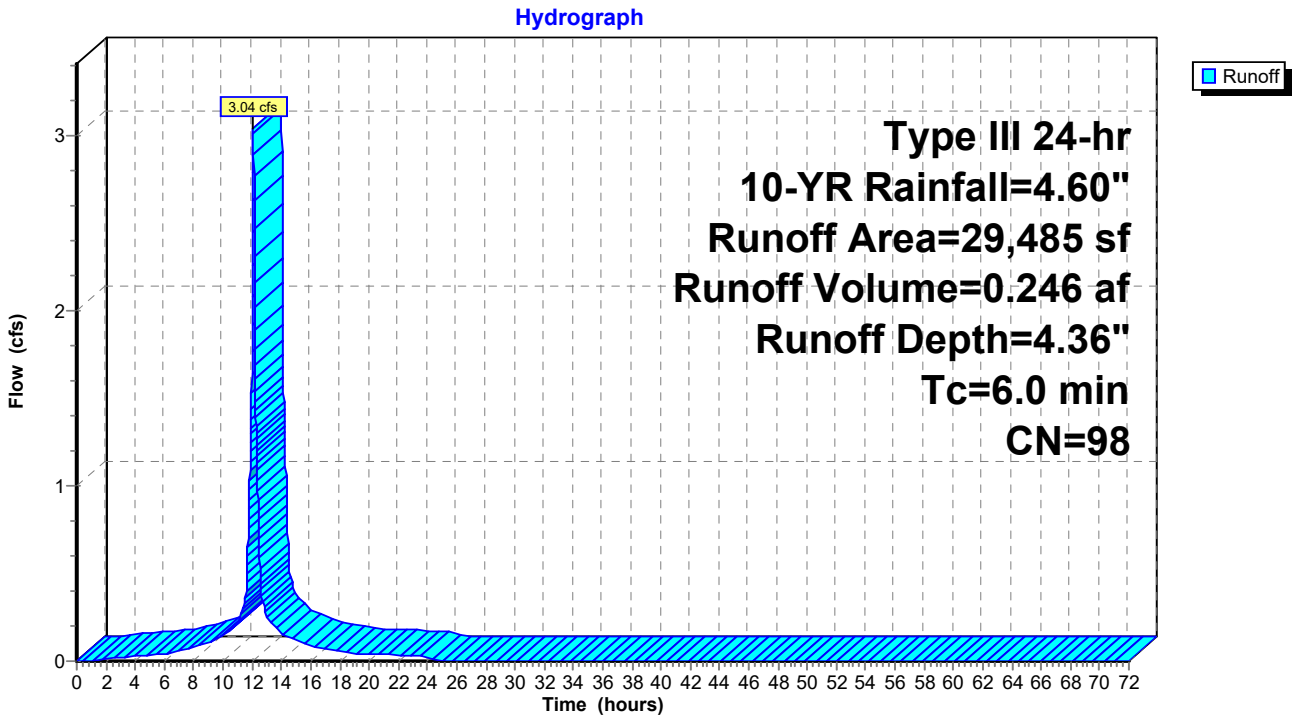
Runoff = 3.04 cfs @ 12.08 hrs, Volume= 0.246 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
5,705	98	Roofs, HSG C
23,780	98	Paved parking, HSG C
29,485	98	Weighted Average
29,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P1: Pre Dev Site

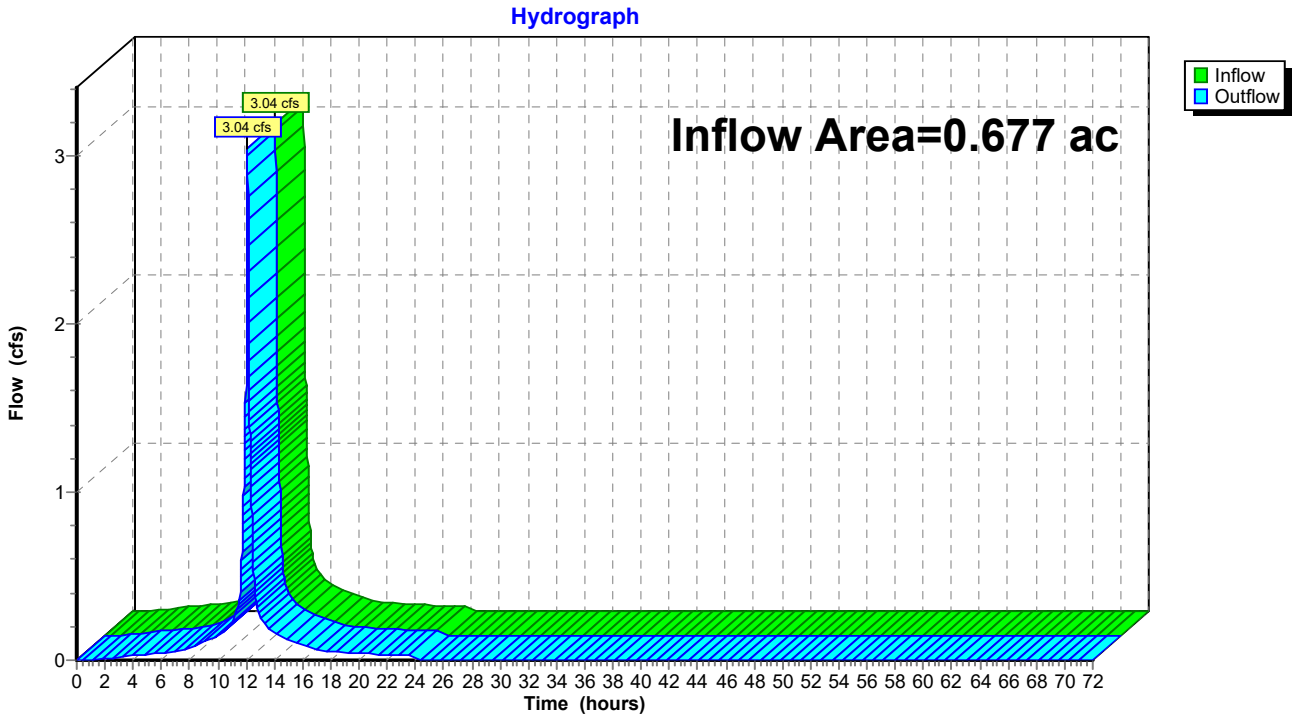


Summary for Reach PRE: Spot Pond Brook

Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 3.04 cfs @ 12.08 hrs, Volume= 0.246 af
Outflow = 3.04 cfs @ 12.08 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach PRE: Spot Pond Brook



Summary for Subcatchment P1: Pre Dev Site

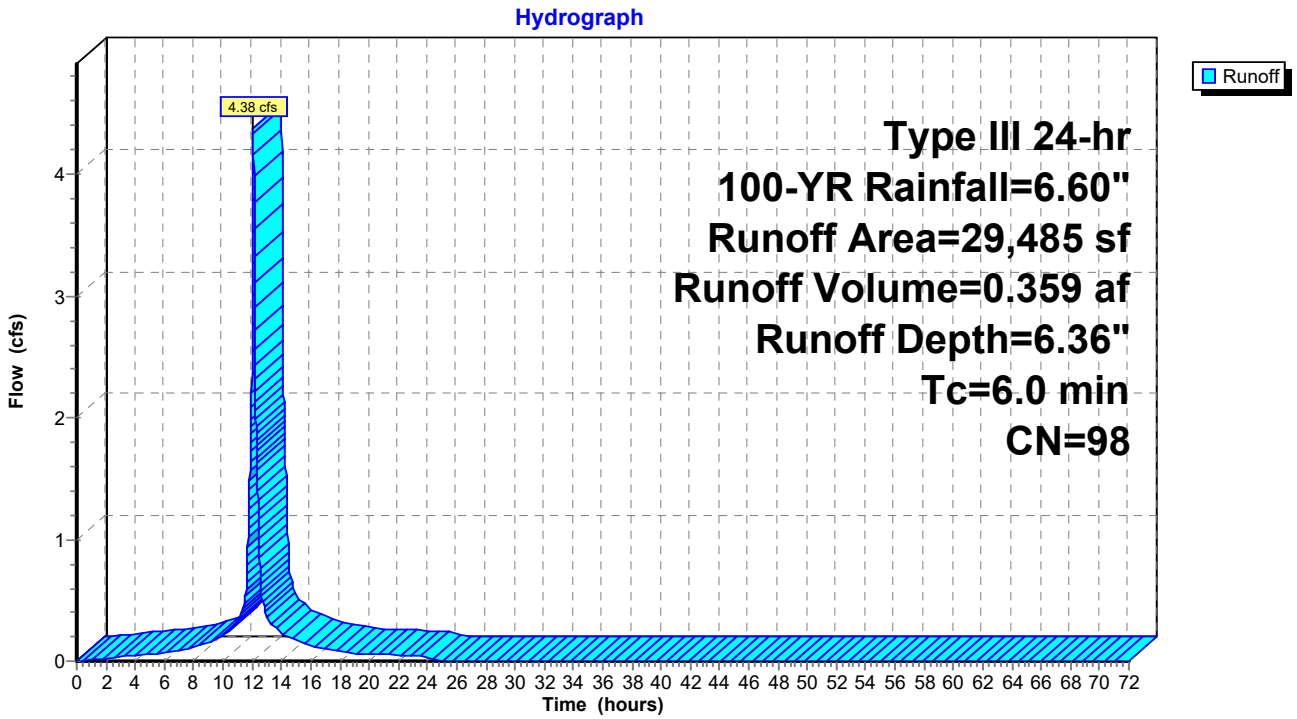
Runoff = 4.38 cfs @ 12.08 hrs, Volume= 0.359 af, Depth= 6.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=6.60"

Area (sf)	CN	Description
5,705	98	Roofs, HSG C
23,780	98	Paved parking, HSG C
29,485	98	Weighted Average
29,485		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P1: Pre Dev Site

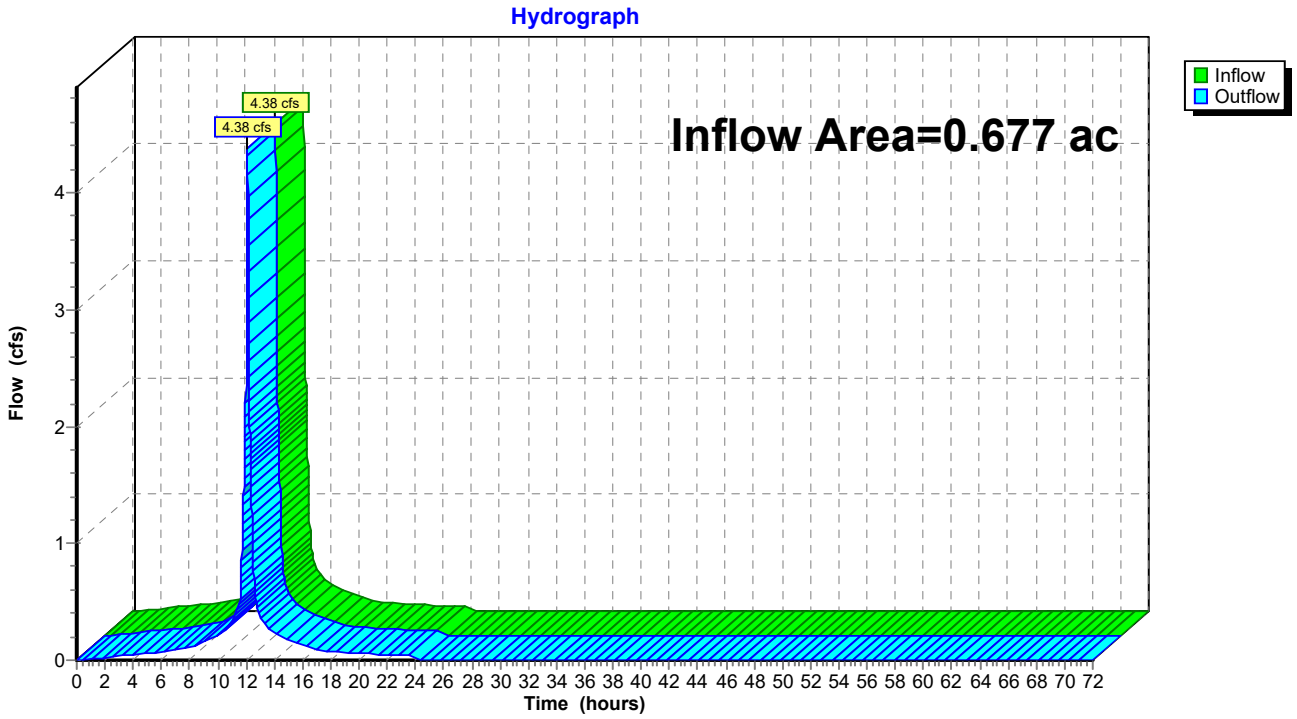


Summary for Reach PRE: Spot Pond Brook

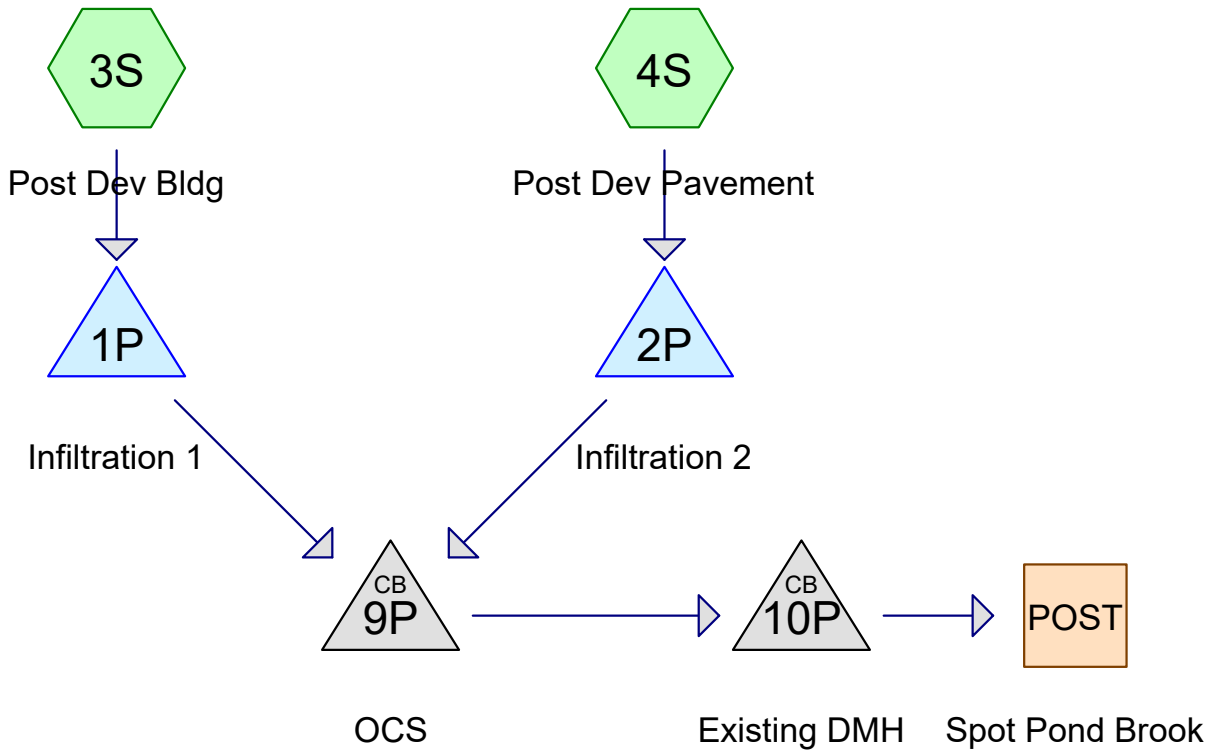
Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 6.36" for 100-YR event
Inflow = 4.38 cfs @ 12.08 hrs, Volume= 0.359 af
Outflow = 4.38 cfs @ 12.08 hrs, Volume= 0.359 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach PRE: Spot Pond Brook



Appendix C:
Post-Construction Hydrology



Subcat Reach Pond Link

Routing Diagram for 19251 Pre & Post
Prepared by Howard Stein Hudson, Printed 10/9/2020

Summary for Subcatchment 3S: Post Dev Bldg

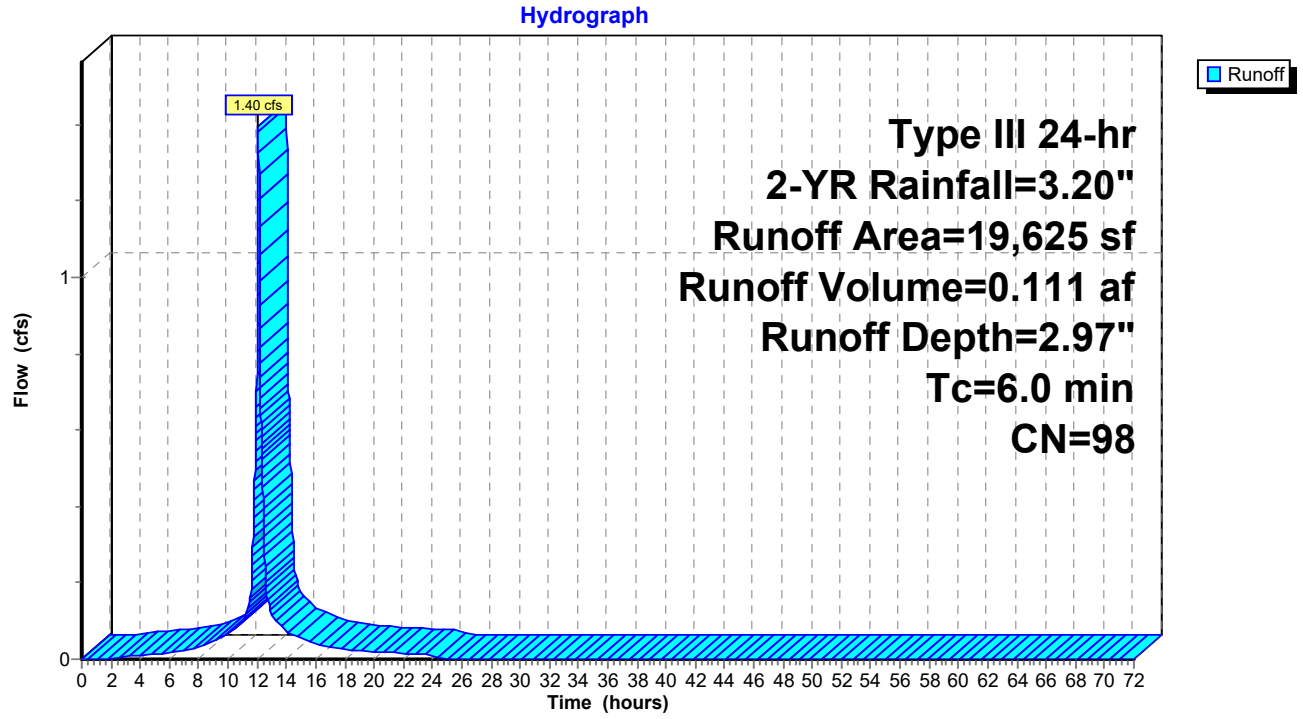
Runoff = 1.40 cfs @ 12.08 hrs, Volume= 0.111 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.20"

Area (sf)	CN	Description
19,625	98	Roofs, HSG C
19,625		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: Post Dev Bldg



Summary for Subcatchment 4S: Post Dev Pavement

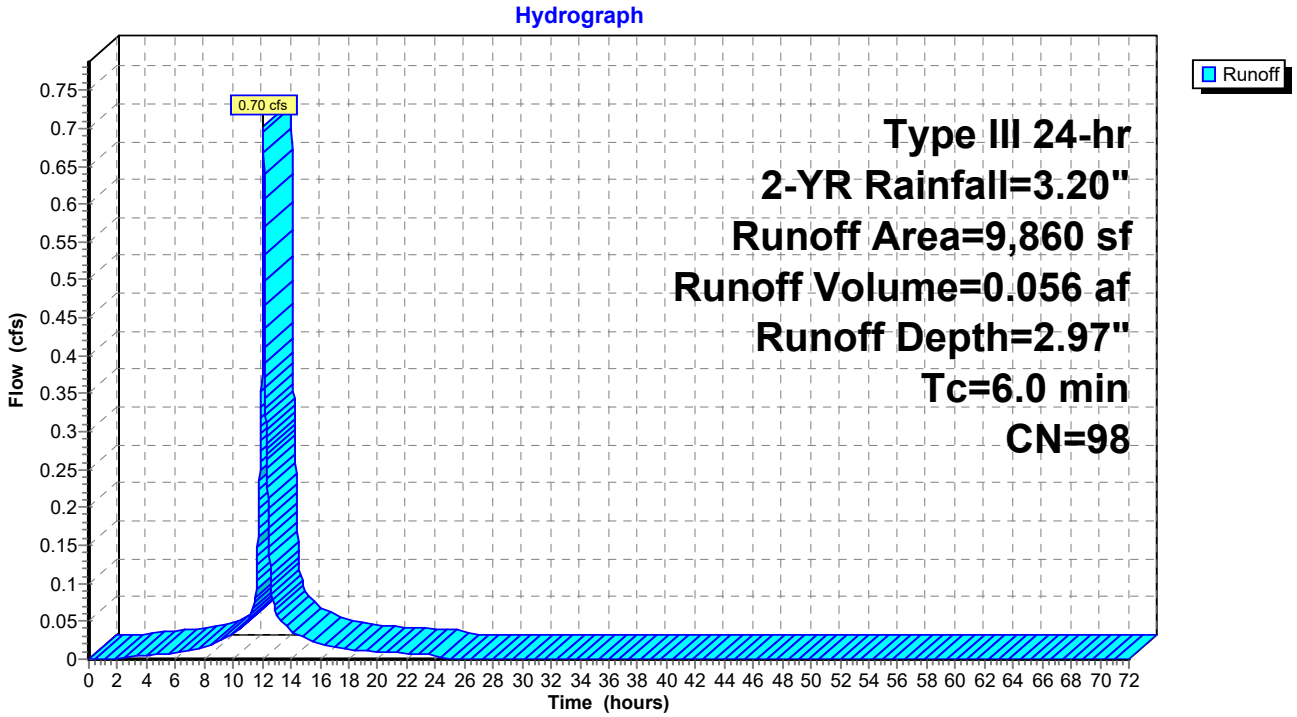
Runoff = 0.70 cfs @ 12.08 hrs, Volume= 0.056 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.20"

Area (sf)	CN	Description
9,860	98	Paved parking, HSG C
9,860		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: Post Dev Pavement

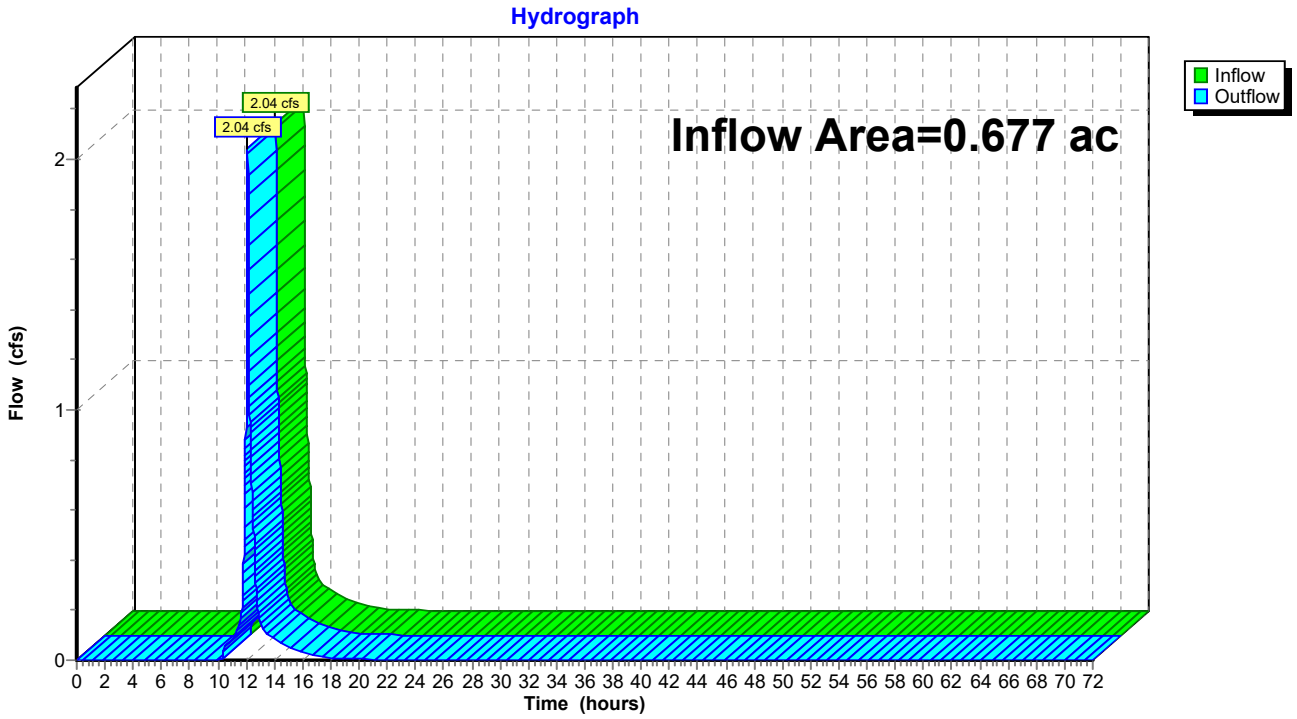


Summary for Reach POST: Spot Pond Brook

Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 1.85" for 2-YR event
Inflow = 2.04 cfs @ 12.10 hrs, Volume= 0.105 af
Outflow = 2.04 cfs @ 12.10 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach POST: Spot Pond Brook



Summary for Pond 1P: Infiltration 1

Inflow Area = 0.451 ac,100.00% Impervious, Inflow Depth = 2.97" for 2-YR event
Inflow = 1.40 cfs @ 12.08 hrs, Volume= 0.111 af
Outflow = 1.39 cfs @ 12.09 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.034 af
Primary = 1.38 cfs @ 12.09 hrs, Volume= 0.077 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 9.70' @ 12.09 hrs Surf.Area= 256 sf Storage= 684 cf

Plug-Flow detention time= 146.5 min calculated for 0.111 af (100% of inflow)
Center-of-Mass det. time= 146.6 min (903.0 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.50'	115 cf	**8.00'W x 32.00'L x 5.08'H Field A** 1,301 cf Overall - 917 cf Embedded = 384 cf x 30.0% Voids
#2A	7.00'	632 cf	**Oldcastle StormCapture SC1 3'** x 2 Inside #1 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 1 Rows adjusted for 10.0 cf perimeter wall
		747 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	9.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	7.50'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
#4	Discarded	5.50'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 5.10'

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=9.70' (Free Discharge)
└**4=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=1.37 cfs @ 12.09 hrs HW=9.70' (Free Discharge)
└**1=Culvert** (Passes 1.37 cfs of 1.87 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Weir Controls 0.99 cfs @ 1.25 fps)
  └**3=Orifice/Grate** (Orifice Controls 0.38 cfs @ 4.30 fps)

Pond 1P: Infiltration 1 - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 3' (Oldcastle StormCapture®SC1)
Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
1 Rows adjusted for 10.0 cf perimeter wall

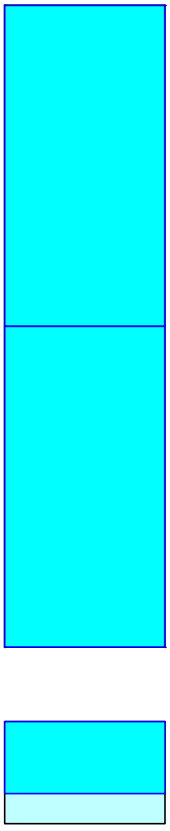
2 Chambers/Row x 16.00' Long = 32.00' Row Length
1 Rows x 96.0" Wide = 8.00' Base Width
18.0" Base + 43.0" Chamber Height = 5.08' Field Height

2.0 cf Sidewall x 2 x 2 + 1.0 cf Endwall x 1 x 2 = 10.0 cf Perimeter Wall
2 Chambers x 321.0 cf - 10.0 cf Perimeter wall = 632.0 cf Chamber Storage
2 Chambers x 458.7 cf = 917.3 cf Displacement

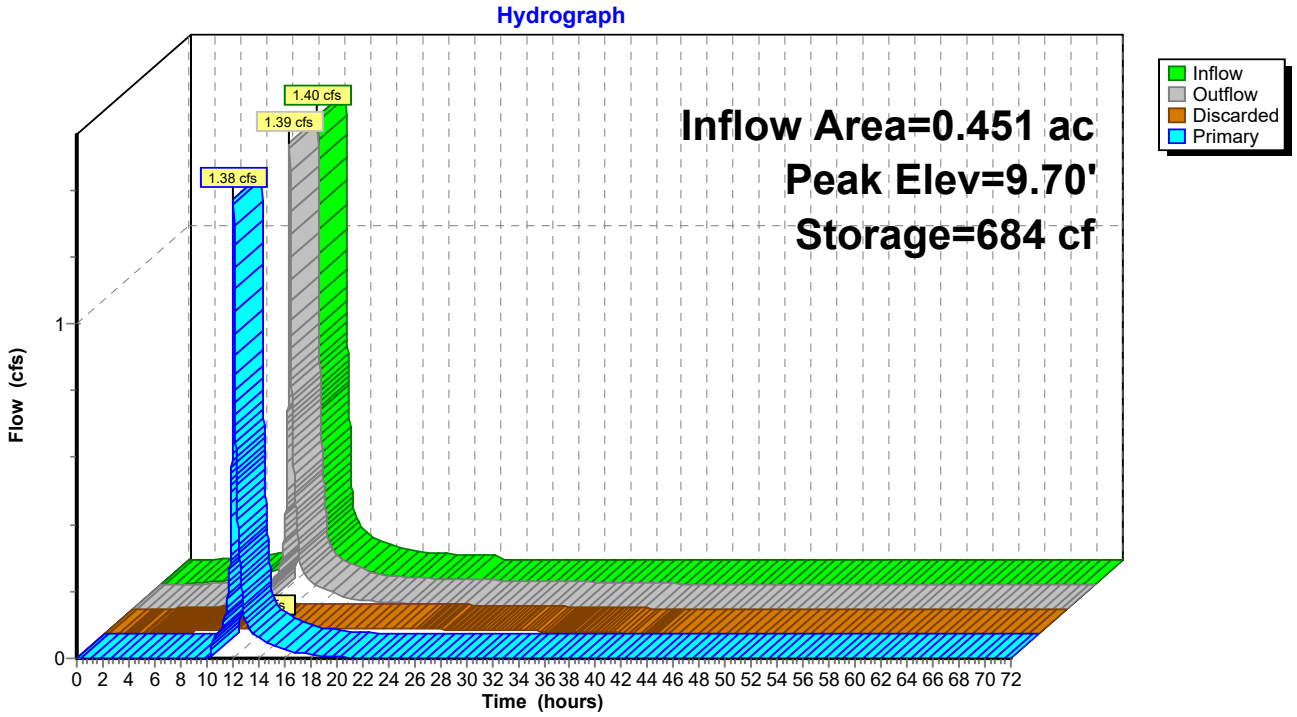
1,301.3 cf Field - 917.3 cf Chambers = 384.0 cf Stone x 30.0% Voids = 115.2 cf Stone Storage

Chamber Storage + Stone Storage = 747.2 cf = 0.017 af
Overall Storage Efficiency = 57.4%
Overall System Size = 32.00' x 8.00' x 5.08'

2 Chambers
48.2 cy Field
14.2 cy Stone



Pond 1P: Infiltration 1



Summary for Pond 2P: Infiltration 2

Inflow Area = 0.226 ac,100.00% Impervious, Inflow Depth = 2.97" for 2-YR event
Inflow = 0.70 cfs @ 12.08 hrs, Volume= 0.056 af
Outflow = 0.69 cfs @ 12.10 hrs, Volume= 0.056 af, Atten= 2%, Lag= 1.0 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.029 af
Primary = 0.67 cfs @ 12.10 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 9.59' @ 12.10 hrs Surf.Area= 256 sf Storage= 661 cf

Plug-Flow detention time= 230.8 min calculated for 0.056 af (100% of inflow)
Center-of-Mass det. time= 230.9 min (987.3 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.50'	115 cf	**8.00'W x 32.00'L x 5.08'H Field A** 1,301 cf Overall - 917 cf Embedded = 384 cf x 30.0% Voids
#2A	7.00'	632 cf	**Oldcastle StormCapture SC1 3'** x 2 Inside #1 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 1 Rows adjusted for 10.0 cf perimeter wall
		747 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	9.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	7.50'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
#4	Discarded	5.50'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 5.10'

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=9.59' (Free Discharge)
└**4=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.66 cfs @ 12.10 hrs HW=9.59' (Free Discharge)
└**1=Culvert** (Passes 0.66 cfs of 1.50 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Weir Controls 0.31 cfs @ 0.85 fps)
  └**3=Orifice/Grate** (Orifice Controls 0.35 cfs @ 4.01 fps)

Pond 2P: Infiltration 2 - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 3' (Oldcastle StormCapture®SC1)
Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
1 Rows adjusted for 10.0 cf perimeter wall

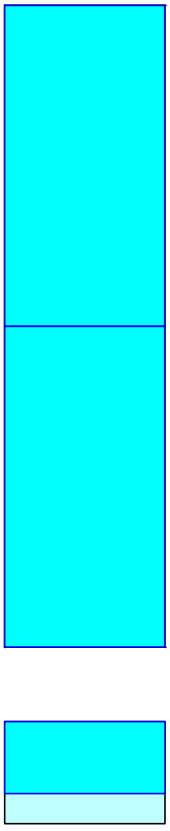
2 Chambers/Row x 16.00' Long = 32.00' Row Length
1 Rows x 96.0" Wide = 8.00' Base Width
18.0" Base + 43.0" Chamber Height = 5.08' Field Height

2.0 cf Sidewall x 2 x 2 + 1.0 cf Endwall x 1 x 2 = 10.0 cf Perimeter Wall
2 Chambers x 321.0 cf - 10.0 cf Perimeter wall = 632.0 cf Chamber Storage
2 Chambers x 458.7 cf = 917.3 cf Displacement

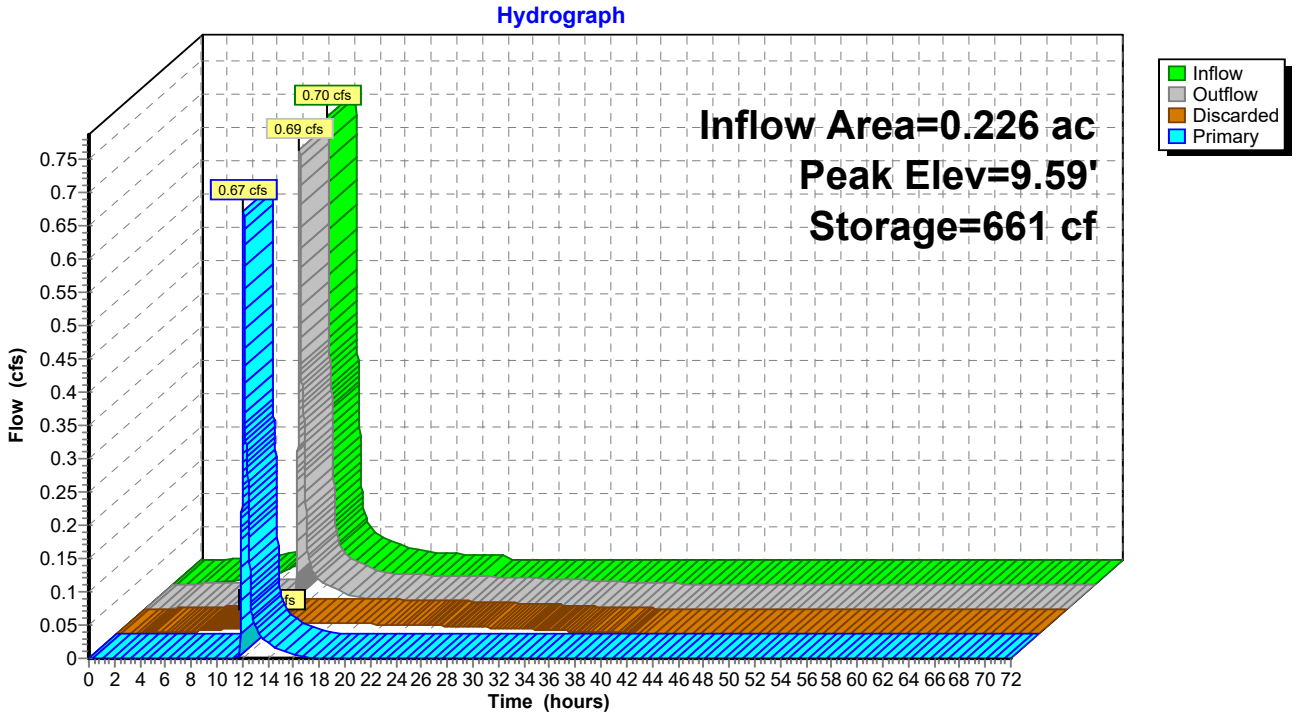
1,301.3 cf Field - 917.3 cf Chambers = 384.0 cf Stone x 30.0% Voids = 115.2 cf Stone Storage

Chamber Storage + Stone Storage = 747.2 cf = 0.017 af
Overall Storage Efficiency = 57.4%
Overall System Size = 32.00' x 8.00' x 5.08'

2 Chambers
48.2 cy Field
14.2 cy Stone



Pond 2P: Infiltration 2



Summary for Pond 9P: OCS

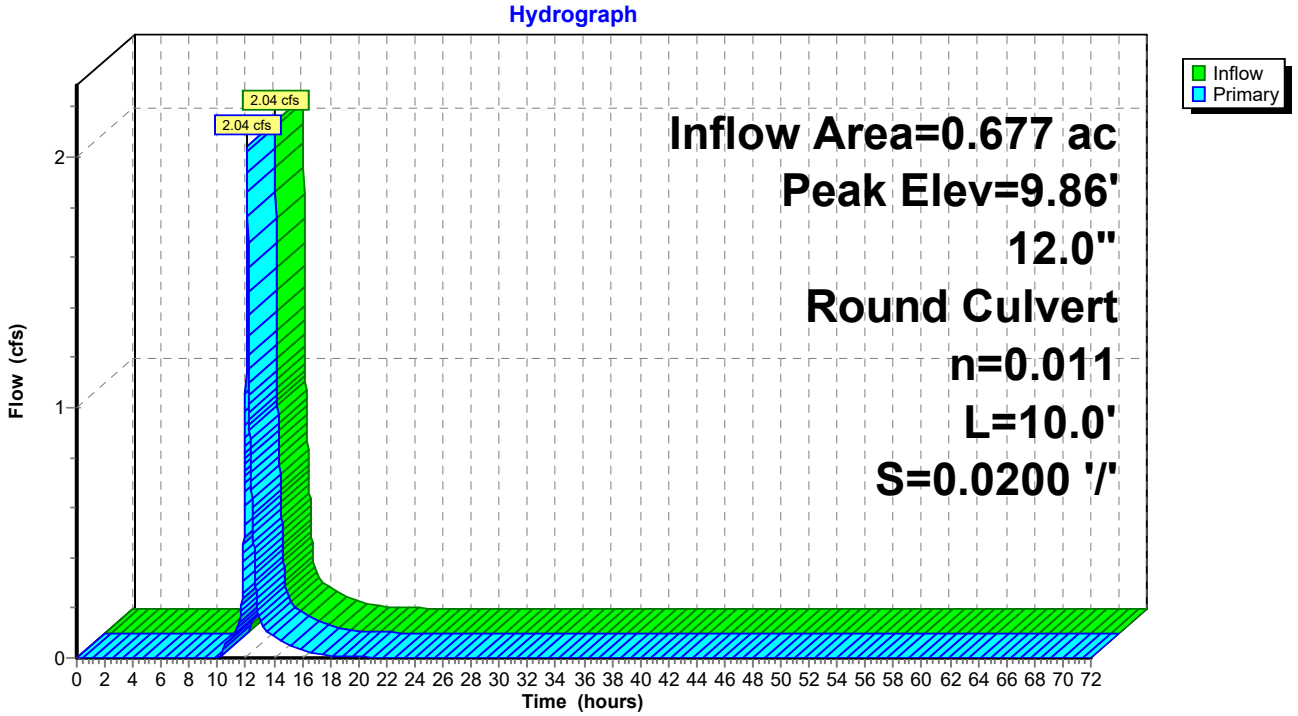
Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 1.85" for 2-YR event
Inflow = 2.04 cfs @ 12.10 hrs, Volume= 0.105 af
Outflow = 2.04 cfs @ 12.10 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min
Primary = 2.04 cfs @ 12.10 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 9.86' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' Ke= 0.900 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.04 cfs @ 12.10 hrs HW=9.86' (Free Discharge)
1=Culvert (Inlet Controls 2.04 cfs @ 2.63 fps)

Pond 9P: OCS



Summary for Pond 10P: Existing DMH

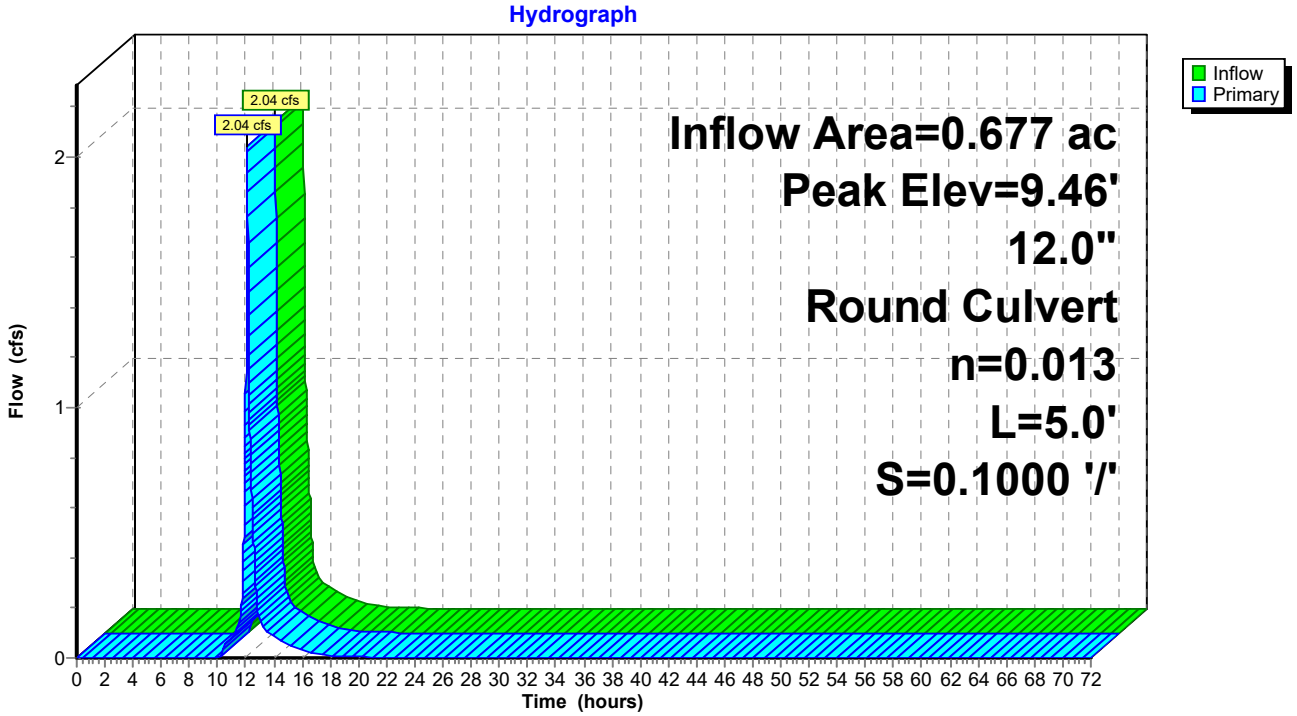
Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 1.85" for 2-YR event
Inflow = 2.04 cfs @ 12.10 hrs, Volume= 0.105 af
Outflow = 2.04 cfs @ 12.10 hrs, Volume= 0.105 af, Atten= 0%, Lag= 0.0 min
Primary = 2.04 cfs @ 12.10 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 9.46' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	8.50'	**12.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 8.50' / 8.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=2.04 cfs @ 12.10 hrs HW=9.46' (Free Discharge)
1=Culvert (Inlet Controls 2.04 cfs @ 2.63 fps)

Pond 10P: Existing DMH



Summary for Subcatchment 3S: Post Dev Bldg

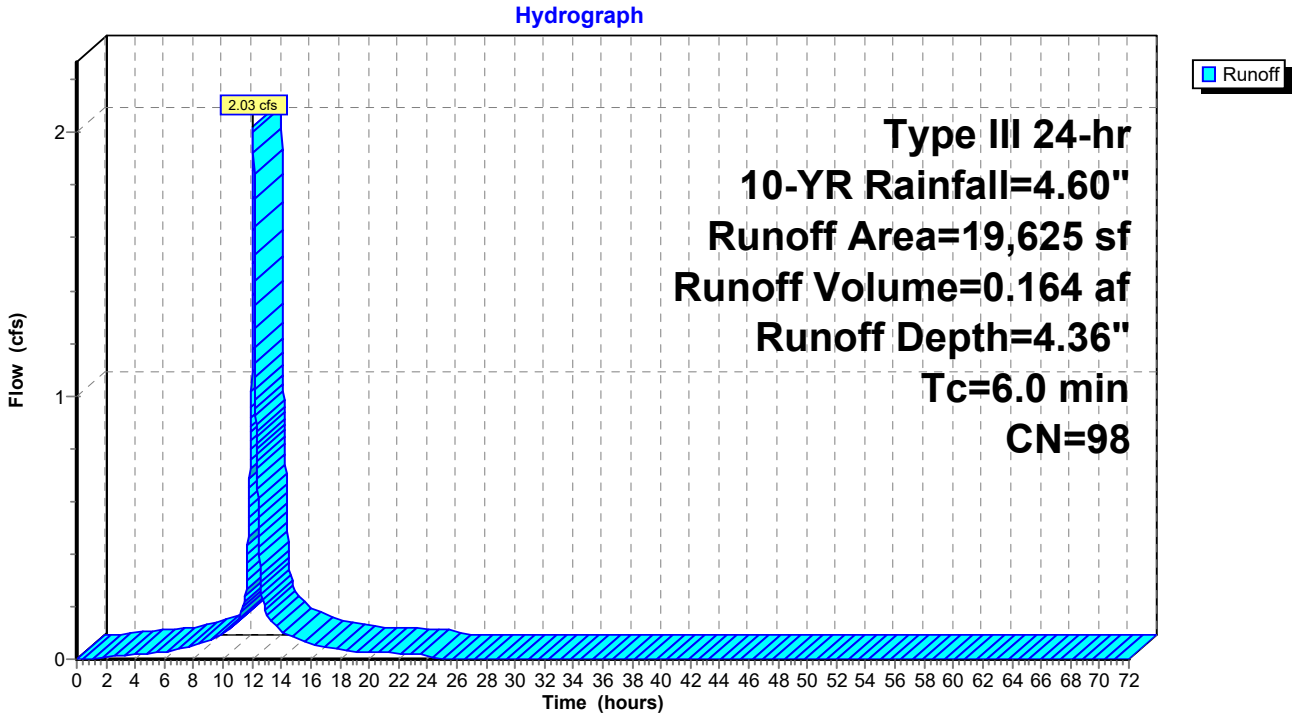
Runoff = 2.03 cfs @ 12.08 hrs, Volume= 0.164 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
19,625	98	Roofs, HSG C
19,625		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: Post Dev Bldg



Summary for Subcatchment 4S: Post Dev Pavement

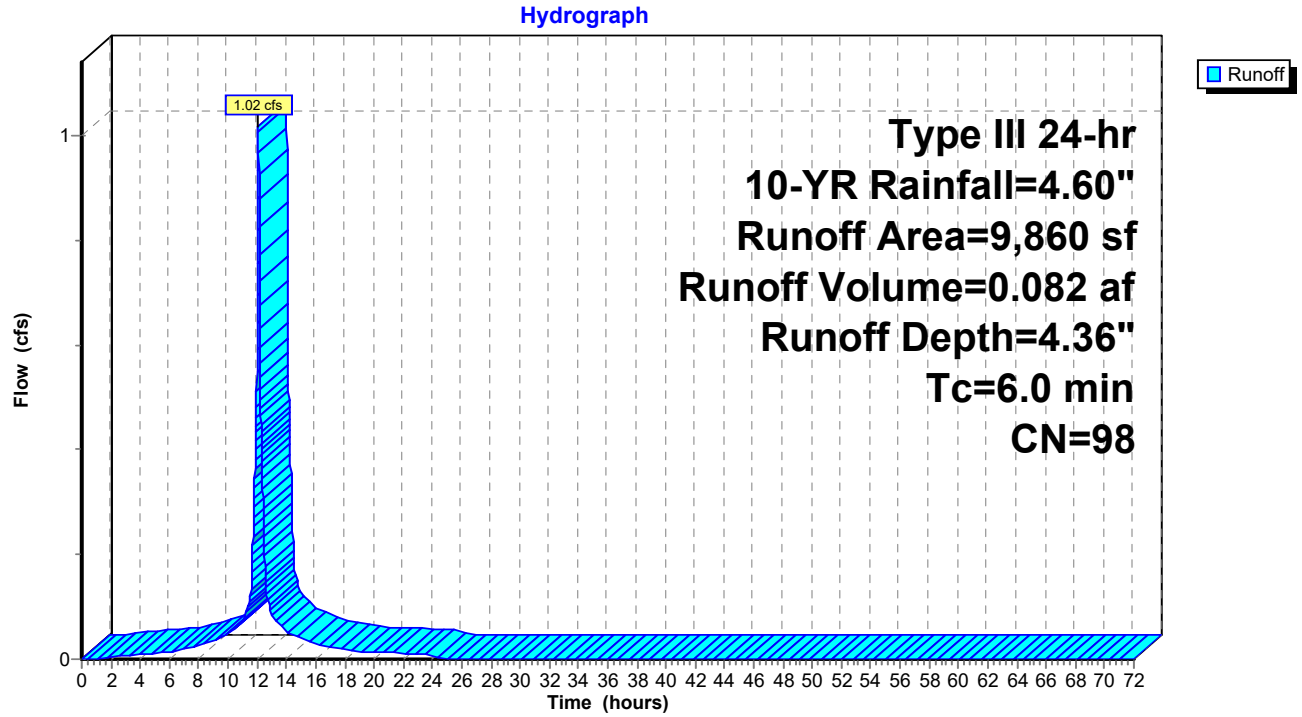
Runoff = 1.02 cfs @ 12.08 hrs, Volume= 0.082 af, Depth= 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
9,860	98	Paved parking, HSG C
9,860		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: Post Dev Pavement

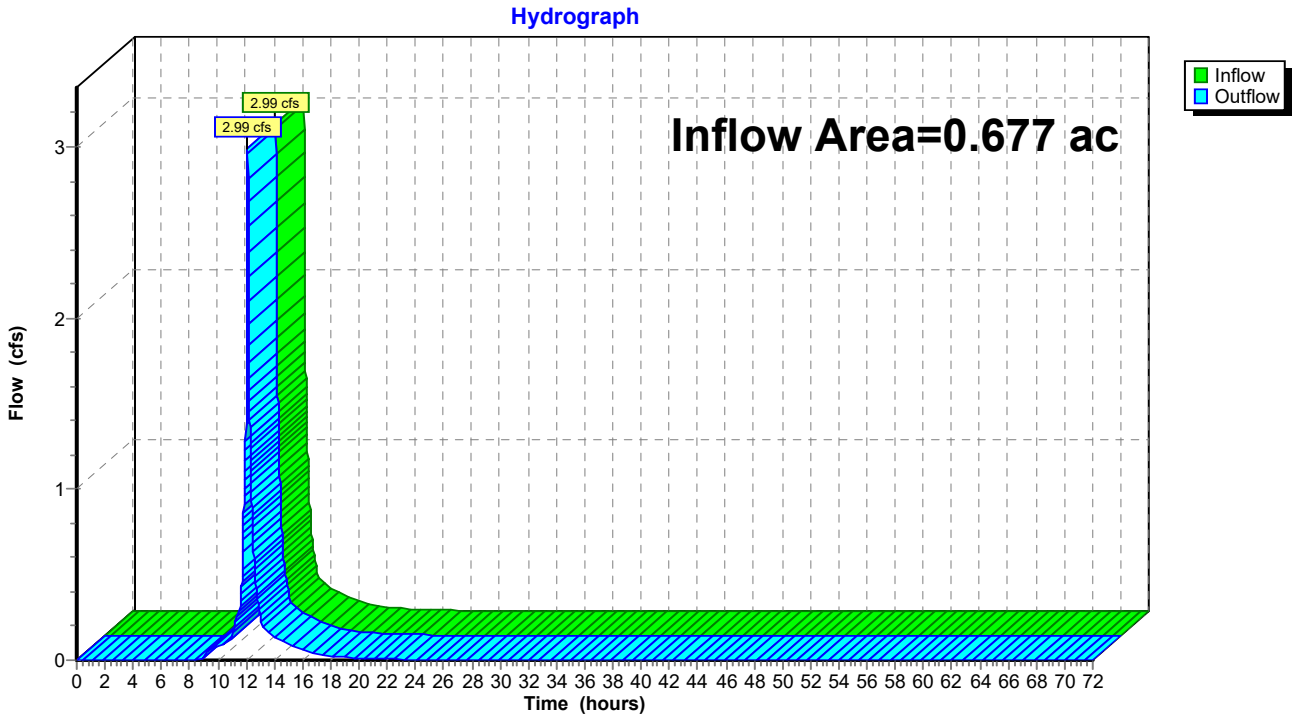


Summary for Reach POST: Spot Pond Brook

Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 3.14" for 10-YR event
Inflow = 2.99 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 2.99 cfs @ 12.09 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach POST: Spot Pond Brook



Summary for Pond 1P: Infiltration 1

Inflow Area = 0.451 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 2.03 cfs @ 12.08 hrs, Volume= 0.164 af
Outflow = 2.02 cfs @ 12.09 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.036 af
Primary = 2.00 cfs @ 12.09 hrs, Volume= 0.127 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 9.77' @ 12.09 hrs Surf.Area= 256 sf Storage= 699 cf

Plug-Flow detention time= 108.2 min calculated for 0.164 af (100% of inflow)
Center-of-Mass det. time= 108.4 min (857.8 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.50'	115 cf	**8.00'W x 32.00'L x 5.08'H Field A** 1,301 cf Overall - 917 cf Embedded = 384 cf x 30.0% Voids
#2A	7.00'	632 cf	**Oldcastle StormCapture SC1 3'** x 2 Inside #1 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 1 Rows adjusted for 10.0 cf perimeter wall
		747 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	9.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	7.50'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
#4	Discarded	5.50'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 5.10'

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=9.77' (Free Discharge)
└**4=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=2.00 cfs @ 12.09 hrs HW=9.77' (Free Discharge)
└**1=Culvert** (Passes 2.00 cfs of 2.13 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Weir Controls 1.61 cfs @ 1.48 fps)
  └**3=Orifice/Grate** (Orifice Controls 0.39 cfs @ 4.50 fps)

Pond 1P: Infiltration 1 - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 3' (Oldcastle StormCapture®SC1)
Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
1 Rows adjusted for 10.0 cf perimeter wall

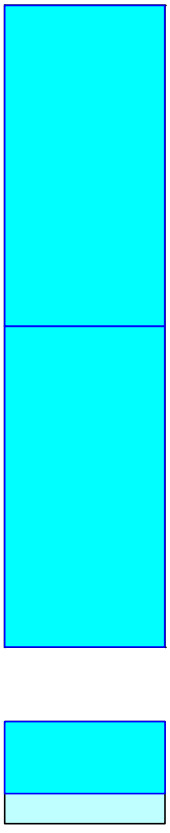
2 Chambers/Row x 16.00' Long = 32.00' Row Length
1 Rows x 96.0" Wide = 8.00' Base Width
18.0" Base + 43.0" Chamber Height = 5.08' Field Height

2.0 cf Sidewall x 2 x 2 + 1.0 cf Endwall x 1 x 2 = 10.0 cf Perimeter Wall
2 Chambers x 321.0 cf - 10.0 cf Perimeter wall = 632.0 cf Chamber Storage
2 Chambers x 458.7 cf = 917.3 cf Displacement

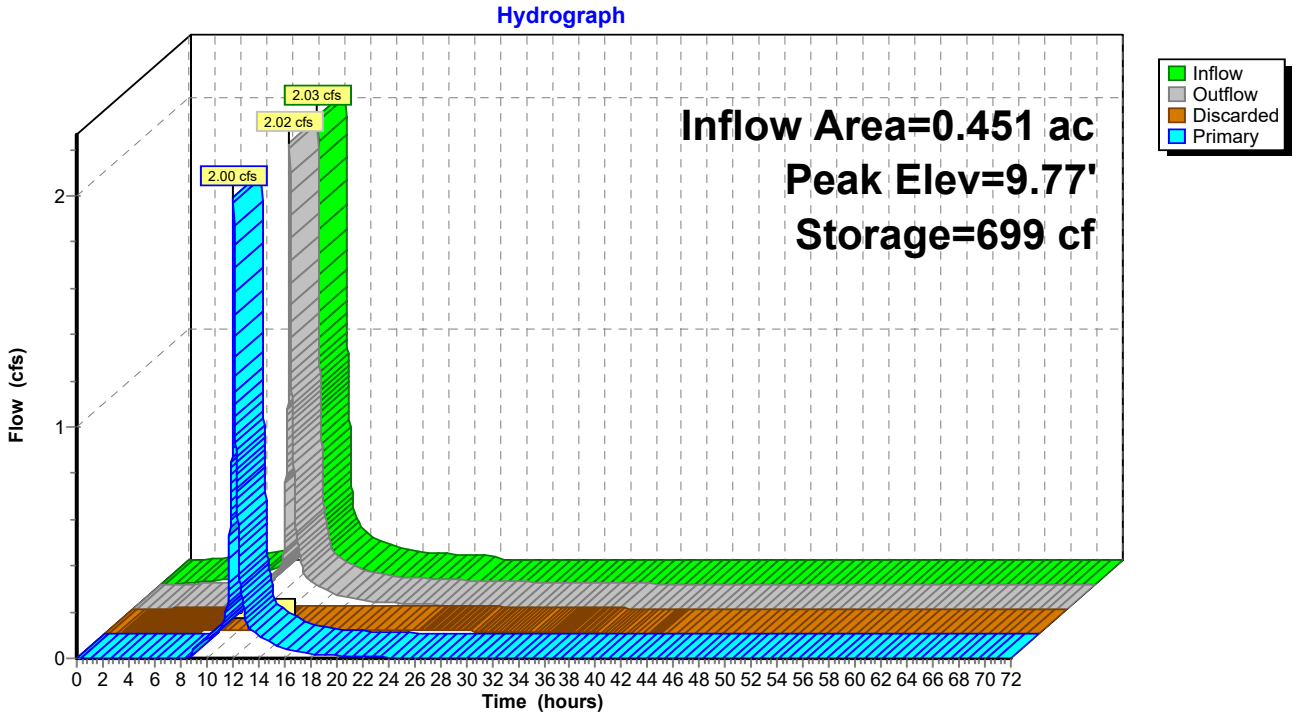
1,301.3 cf Field - 917.3 cf Chambers = 384.0 cf Stone x 30.0% Voids = 115.2 cf Stone Storage

Chamber Storage + Stone Storage = 747.2 cf = 0.017 af
Overall Storage Efficiency = 57.4%
Overall System Size = 32.00' x 8.00' x 5.08'

2 Chambers
48.2 cy Field
14.2 cy Stone



Pond 1P: Infiltration 1



Summary for Pond 2P: Infiltration 2

Inflow Area = 0.226 ac,100.00% Impervious, Inflow Depth = 4.36" for 10-YR event
Inflow = 1.02 cfs @ 12.08 hrs, Volume= 0.082 af
Outflow = 1.01 cfs @ 12.09 hrs, Volume= 0.082 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.032 af
Primary = 0.99 cfs @ 12.09 hrs, Volume= 0.050 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 9.65' @ 12.09 hrs Surf.Area= 256 sf Storage= 673 cf

Plug-Flow detention time= 184.2 min calculated for 0.082 af (100% of inflow)
Center-of-Mass det. time= 184.2 min (933.6 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.50'	115 cf	**8.00'W x 32.00'L x 5.08'H Field A** 1,301 cf Overall - 917 cf Embedded = 384 cf x 30.0% Voids
#2A	7.00'	632 cf	**Oldcastle StormCapture SC1 3'** x 2 Inside #1 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 1 Rows adjusted for 10.0 cf perimeter wall
		747 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	9.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	7.50'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
#4	Discarded	5.50'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 5.10'

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=9.65' (Free Discharge)
└**4=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.99 cfs @ 12.09 hrs HW=9.65' (Free Discharge)
└**1=Culvert** (Passes 0.99 cfs of 1.69 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Weir Controls 0.62 cfs @ 1.07 fps)
  └**3=Orifice/Grate** (Orifice Controls 0.36 cfs @ 4.16 fps)

Pond 2P: Infiltration 2 - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 3' (Oldcastle StormCapture®SC1)
Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
1 Rows adjusted for 10.0 cf perimeter wall

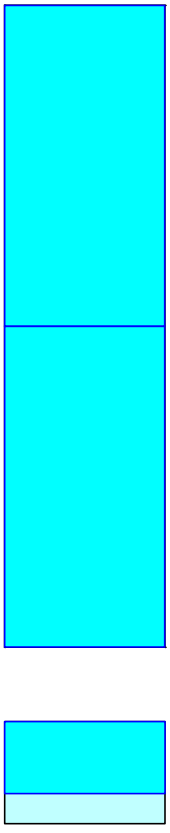
2 Chambers/Row x 16.00' Long = 32.00' Row Length
1 Rows x 96.0" Wide = 8.00' Base Width
18.0" Base + 43.0" Chamber Height = 5.08' Field Height

2.0 cf Sidewall x 2 x 2 + 1.0 cf Endwall x 1 x 2 = 10.0 cf Perimeter Wall
2 Chambers x 321.0 cf - 10.0 cf Perimeter wall = 632.0 cf Chamber Storage
2 Chambers x 458.7 cf = 917.3 cf Displacement

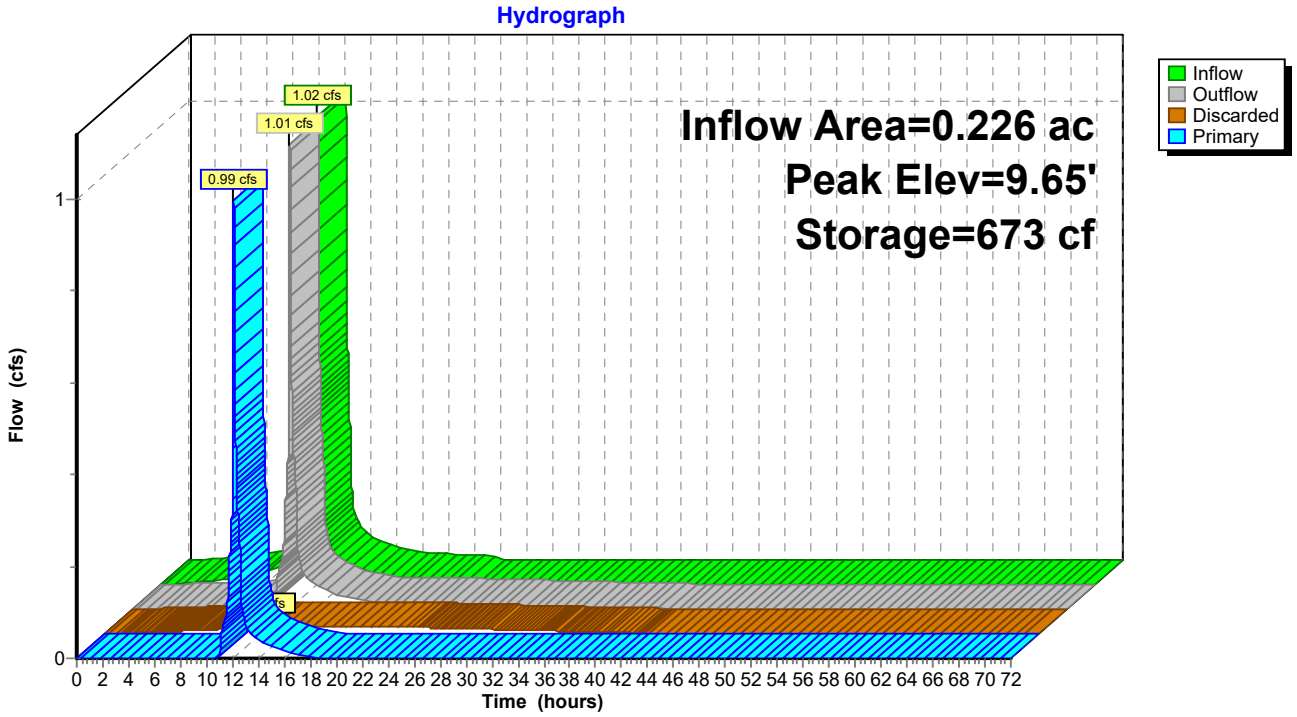
1,301.3 cf Field - 917.3 cf Chambers = 384.0 cf Stone x 30.0% Voids = 115.2 cf Stone Storage

Chamber Storage + Stone Storage = 747.2 cf = 0.017 af
Overall Storage Efficiency = 57.4%
Overall System Size = 32.00' x 8.00' x 5.08'

2 Chambers
48.2 cy Field
14.2 cy Stone



Pond 2P: Infiltration 2



Summary for Pond 9P: OCS

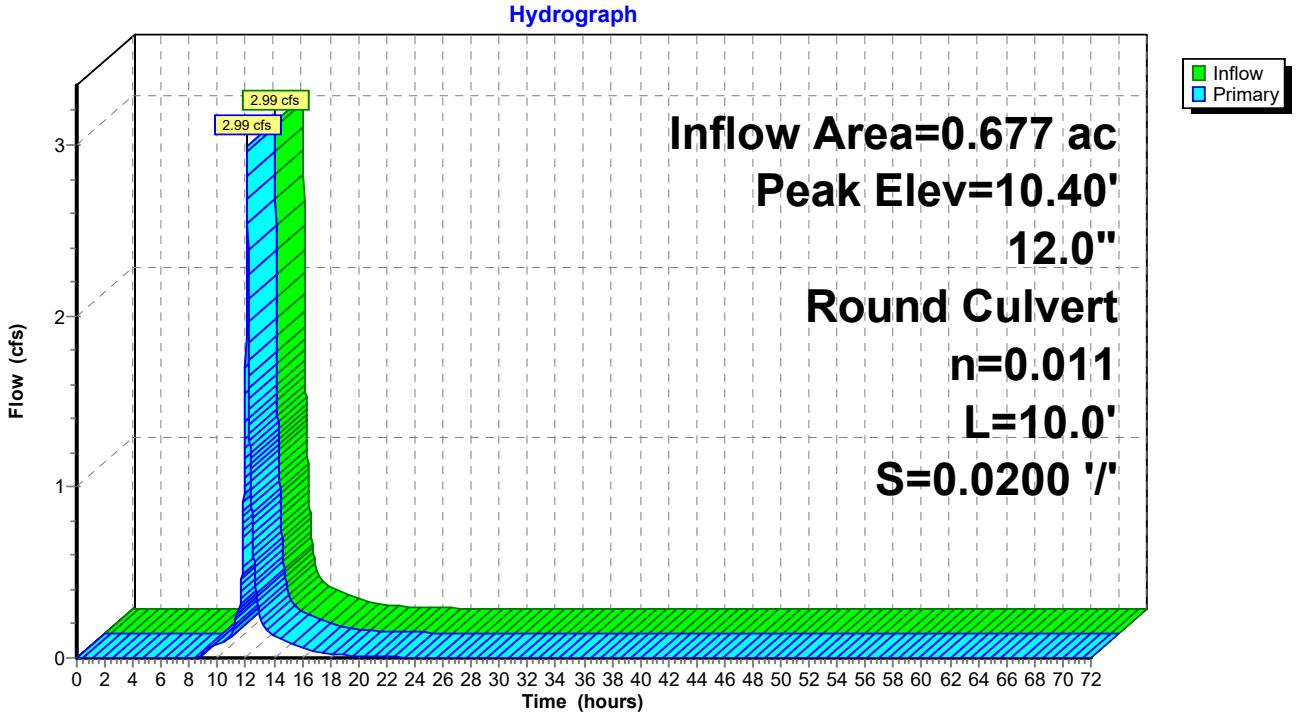
Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 3.14" for 10-YR event
Inflow = 2.99 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 2.99 cfs @ 12.09 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min
Primary = 2.99 cfs @ 12.09 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 10.40' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' Ke= 0.900 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=2.99 cfs @ 12.09 hrs HW=10.40' (Free Discharge)
1=Culvert (Inlet Controls 2.99 cfs @ 3.81 fps)

Pond 9P: OCS



Summary for Pond 10P: Existing DMH

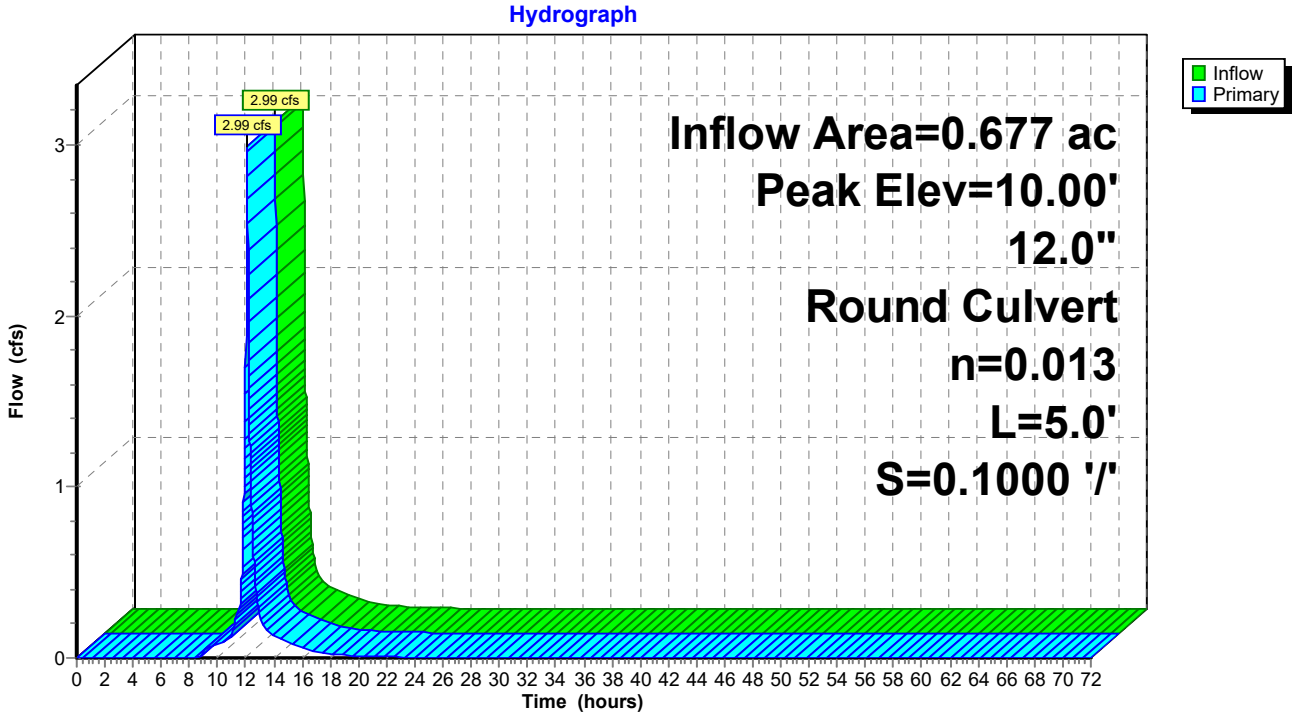
Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 3.14" for 10-YR event
Inflow = 2.99 cfs @ 12.09 hrs, Volume= 0.177 af
Outflow = 2.99 cfs @ 12.09 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min
Primary = 2.99 cfs @ 12.09 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 10.00' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	8.50'	**12.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 8.50' / 8.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=2.99 cfs @ 12.09 hrs HW=10.00' (Free Discharge)
↳**1=Culvert** (Inlet Controls 2.99 cfs @ 3.81 fps)

Pond 10P: Existing DMH



Summary for Subcatchment 3S: Post Dev Bldg

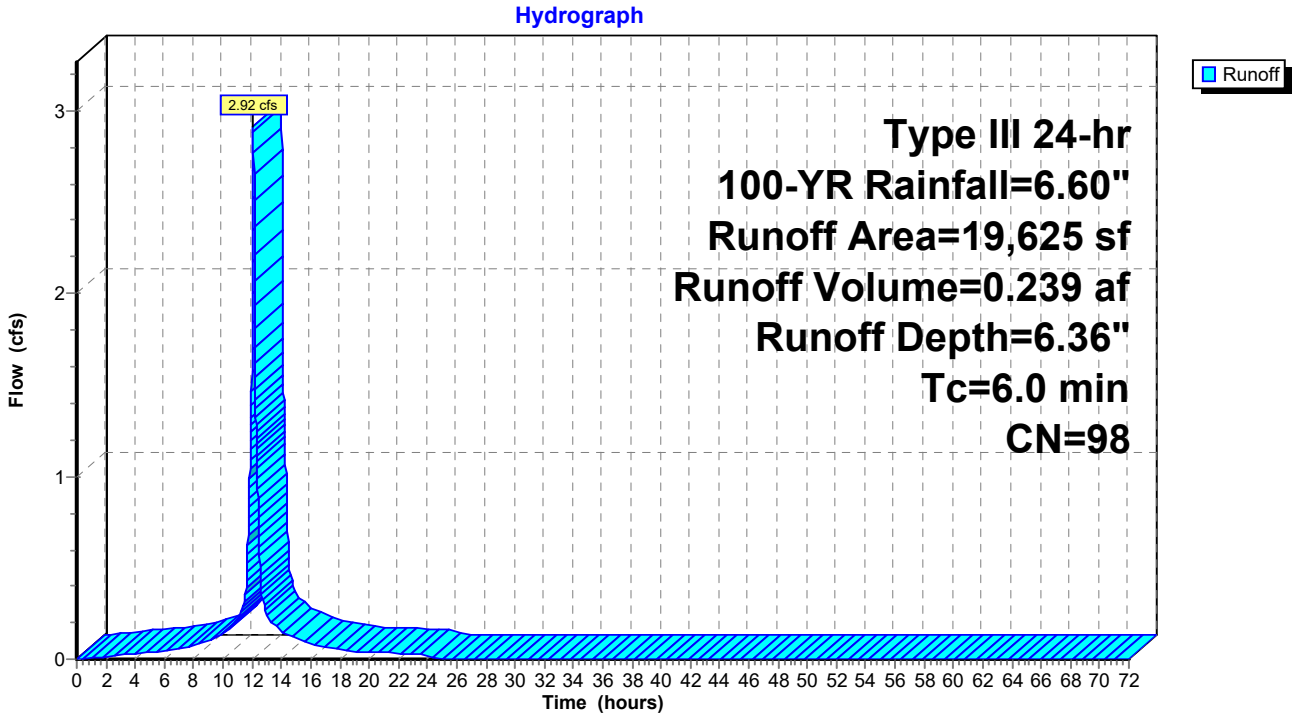
Runoff = 2.92 cfs @ 12.08 hrs, Volume= 0.239 af, Depth= 6.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=6.60"

Area (sf)	CN	Description
19,625	98	Roofs, HSG C
19,625		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 3S: Post Dev Bldg



Summary for Subcatchment 4S: Post Dev Pavement

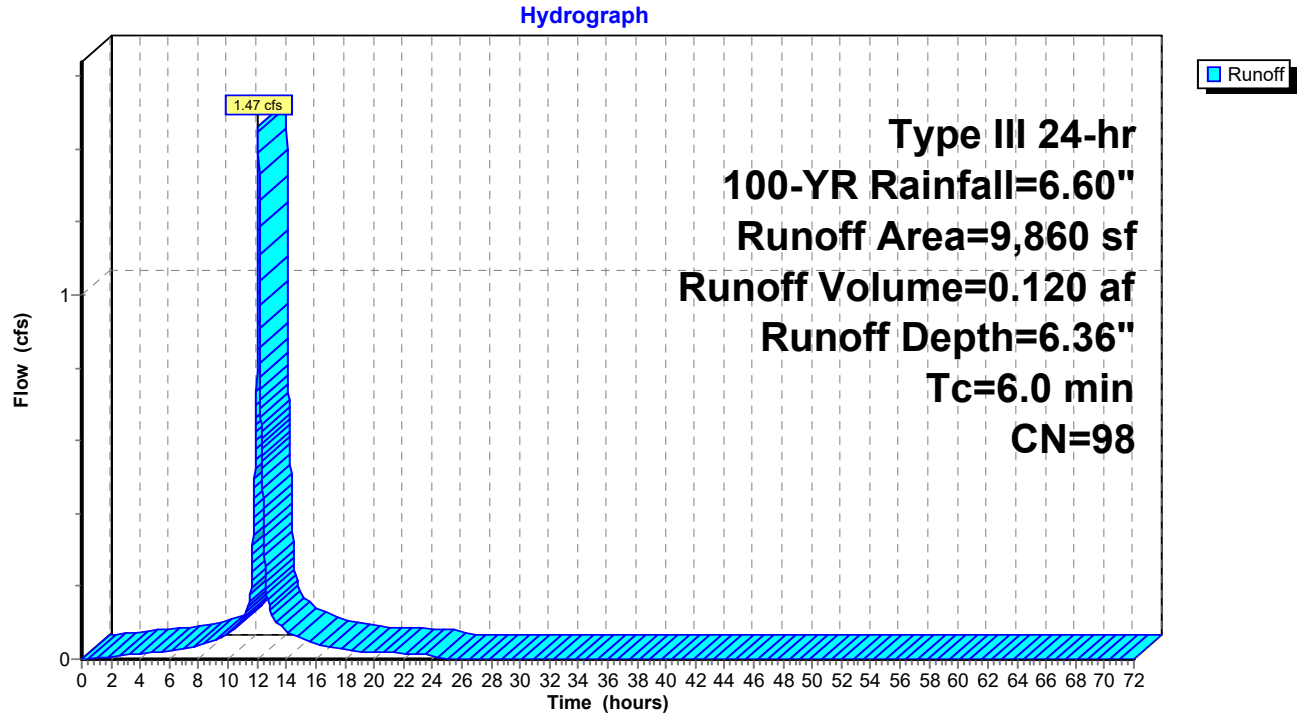
Runoff = 1.47 cfs @ 12.08 hrs, Volume= 0.120 af, Depth= 6.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=6.60"

Area (sf)	CN	Description
9,860	98	Paved parking, HSG C
9,860		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 4S: Post Dev Pavement

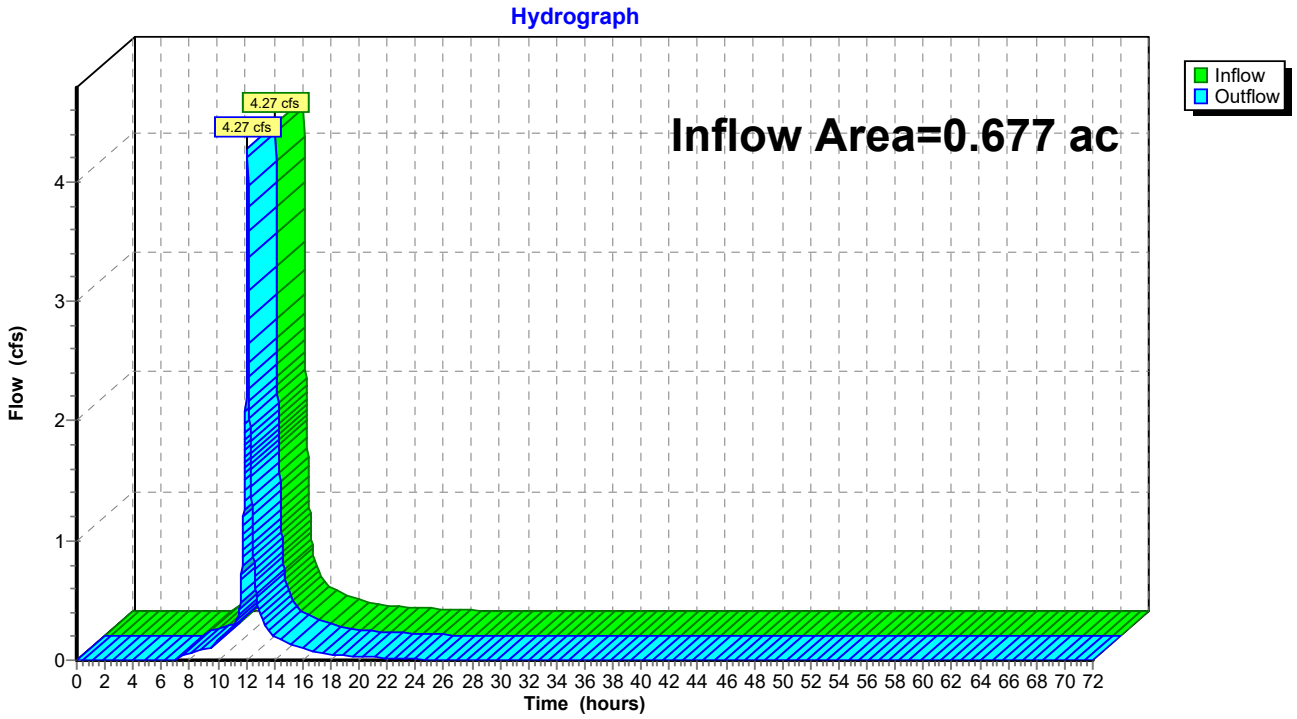


Summary for Reach POST: Spot Pond Brook

Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 5.05" for 100-YR event
Inflow = 4.27 cfs @ 12.10 hrs, Volume= 0.285 af
Outflow = 4.27 cfs @ 12.10 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach POST: Spot Pond Brook



Summary for Pond 1P: Infiltration 1

Inflow Area = 0.451 ac,100.00% Impervious, Inflow Depth = 6.36" for 100-YR event
Inflow = 2.92 cfs @ 12.08 hrs, Volume= 0.239 af
Outflow = 2.86 cfs @ 12.10 hrs, Volume= 0.239 af, Atten= 2%, Lag= 1.0 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.038 af
Primary = 2.84 cfs @ 12.10 hrs, Volume= 0.200 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 9.98' @ 12.10 hrs Surf.Area= 256 sf Storage= 743 cf

Plug-Flow detention time= 80.0 min calculated for 0.239 af (100% of inflow)
Center-of-Mass det. time= 80.1 min (823.9 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.50'	115 cf	**8.00'W x 32.00'L x 5.08'H Field A** 1,301 cf Overall - 917 cf Embedded = 384 cf x 30.0% Voids
#2A	7.00'	632 cf	**Oldcastle StormCapture SC1 3'** x 2 Inside #1 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 1 Rows adjusted for 10.0 cf perimeter wall
		747 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	9.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	7.50'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
#4	Discarded	5.50'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 5.10'

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=9.98' (Free Discharge)
└**4=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=2.84 cfs @ 12.10 hrs HW=9.98' (Free Discharge)
└**1=Culvert** (Barrel Controls 2.84 cfs @ 4.17 fps)
  ├**2=Broad-Crested Rectangular Weir** (Passes < 3.96 cfs potential flow)
  └**3=Orifice/Grate** (Passes < 0.44 cfs potential flow)

Pond 1P: Infiltration 1 - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 3' (Oldcastle StormCapture®SC1)
Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
1 Rows adjusted for 10.0 cf perimeter wall

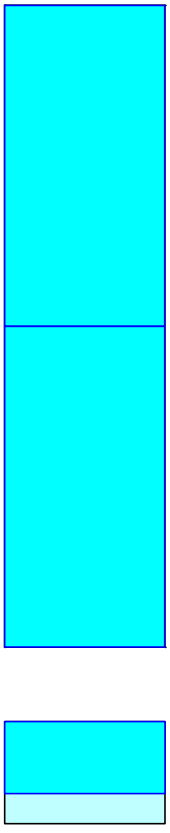
2 Chambers/Row x 16.00' Long = 32.00' Row Length
1 Rows x 96.0" Wide = 8.00' Base Width
18.0" Base + 43.0" Chamber Height = 5.08' Field Height

2.0 cf Sidewall x 2 x 2 + 1.0 cf Endwall x 1 x 2 = 10.0 cf Perimeter Wall
2 Chambers x 321.0 cf - 10.0 cf Perimeter wall = 632.0 cf Chamber Storage
2 Chambers x 458.7 cf = 917.3 cf Displacement

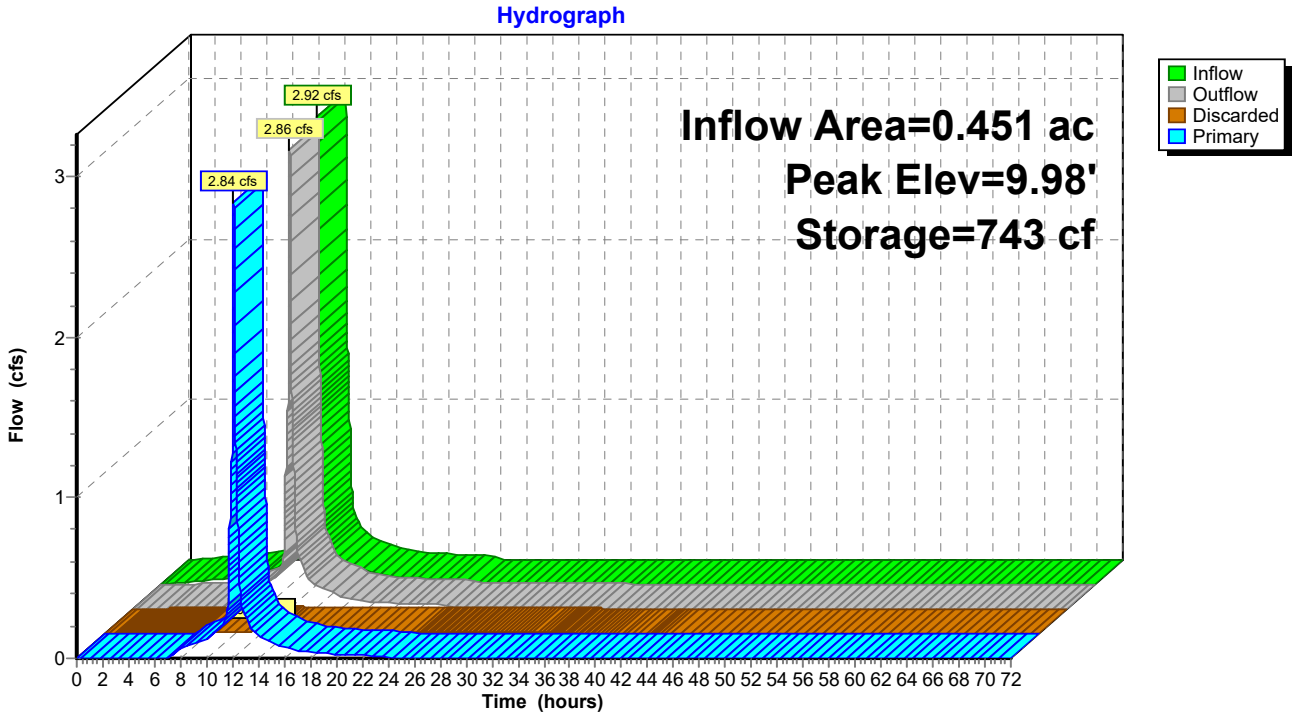
1,301.3 cf Field - 917.3 cf Chambers = 384.0 cf Stone x 30.0% Voids = 115.2 cf Stone Storage

Chamber Storage + Stone Storage = 747.2 cf = 0.017 af
Overall Storage Efficiency = 57.4%
Overall System Size = 32.00' x 8.00' x 5.08'

2 Chambers
48.2 cy Field
14.2 cy Stone



Pond 1P: Infiltration 1



Summary for Pond 2P: Infiltration 2

Inflow Area = 0.226 ac,100.00% Impervious, Inflow Depth = 6.36" for 100-YR event
Inflow = 1.47 cfs @ 12.08 hrs, Volume= 0.120 af
Outflow = 1.46 cfs @ 12.09 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.02 cfs @ 12.09 hrs, Volume= 0.036 af
Primary = 1.44 cfs @ 12.09 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 9.71' @ 12.09 hrs Surf.Area= 256 sf Storage= 685 cf

Plug-Flow detention time= 142.3 min calculated for 0.120 af (100% of inflow)
Center-of-Mass det. time= 142.4 min (886.2 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	5.50'	115 cf	**8.00'W x 32.00'L x 5.08'H Field A** 1,301 cf Overall - 917 cf Embedded = 384 cf x 30.0% Voids
#2A	7.00'	632 cf	**Oldcastle StormCapture SC1 3'** x 2 Inside #1 Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf 1 Rows adjusted for 10.0 cf perimeter wall
		747 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	9.50'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	7.50'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
#4	Discarded	5.50'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 5.10'

Discarded OutFlow Max=0.02 cfs @ 12.09 hrs HW=9.71' (Free Discharge)
└**4=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=1.43 cfs @ 12.09 hrs HW=9.71' (Free Discharge)
└**1=Culvert** (Passes 1.43 cfs of 1.90 cfs potential flow)
  ├**2=Broad-Crested Rectangular Weir** (Weir Controls 1.06 cfs @ 1.28 fps)
  └**3=Orifice/Grate** (Orifice Controls 0.38 cfs @ 4.33 fps)

Pond 2P: Infiltration 2 - Chamber Wizard Field A

Chamber Model = Oldcastle StormCapture SC1 3' (Oldcastle StormCapture®SC1)
Inside= 84.0"W x 36.0"H => 20.06 sf x 16.00'L = 321.0 cf
Outside= 96.0"W x 43.0"H => 28.67 sf x 16.00'L = 458.7 cf
1 Rows adjusted for 10.0 cf perimeter wall

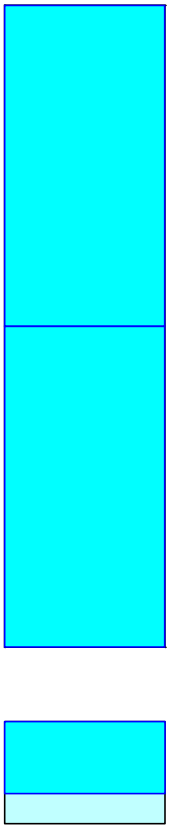
2 Chambers/Row x 16.00' Long = 32.00' Row Length
1 Rows x 96.0" Wide = 8.00' Base Width
18.0" Base + 43.0" Chamber Height = 5.08' Field Height

2.0 cf Sidewall x 2 x 2 + 1.0 cf Endwall x 1 x 2 = 10.0 cf Perimeter Wall
2 Chambers x 321.0 cf - 10.0 cf Perimeter wall = 632.0 cf Chamber Storage
2 Chambers x 458.7 cf = 917.3 cf Displacement

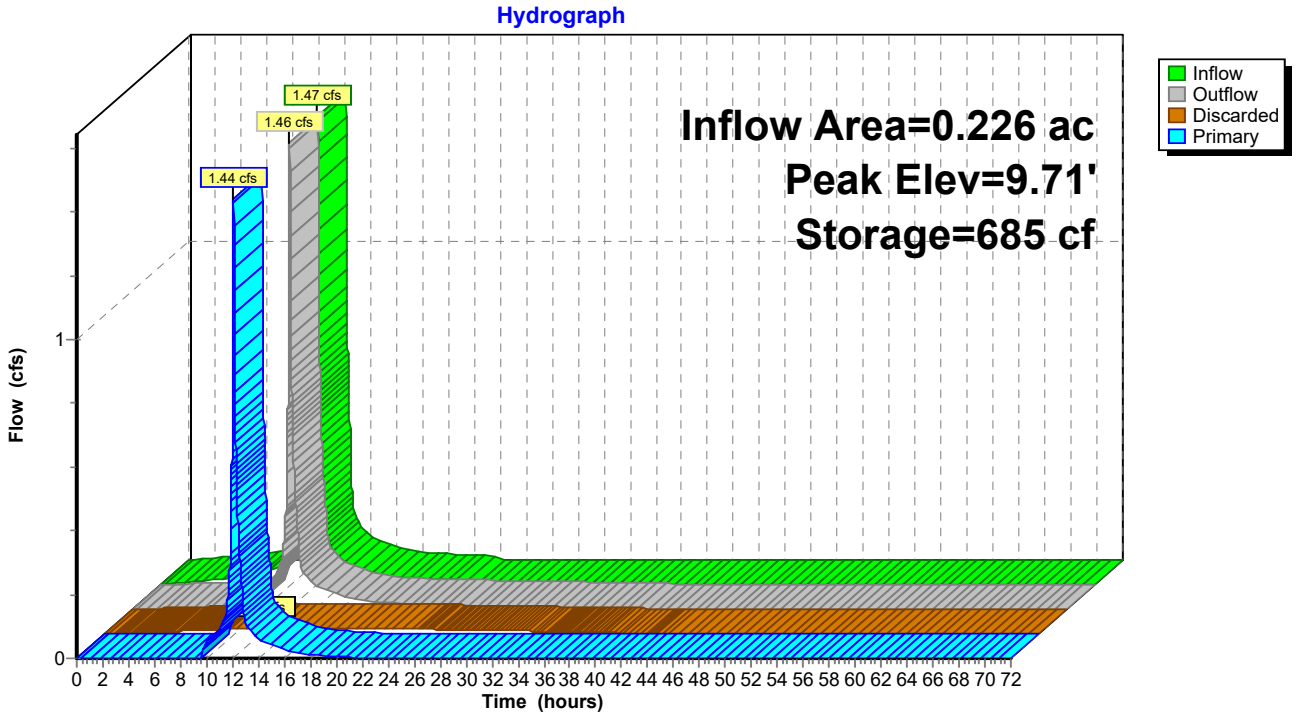
1,301.3 cf Field - 917.3 cf Chambers = 384.0 cf Stone x 30.0% Voids = 115.2 cf Stone Storage

Chamber Storage + Stone Storage = 747.2 cf = 0.017 af
Overall Storage Efficiency = 57.4%
Overall System Size = 32.00' x 8.00' x 5.08'

2 Chambers
48.2 cy Field
14.2 cy Stone



Pond 2P: Infiltration 2



Summary for Pond 9P: OCS

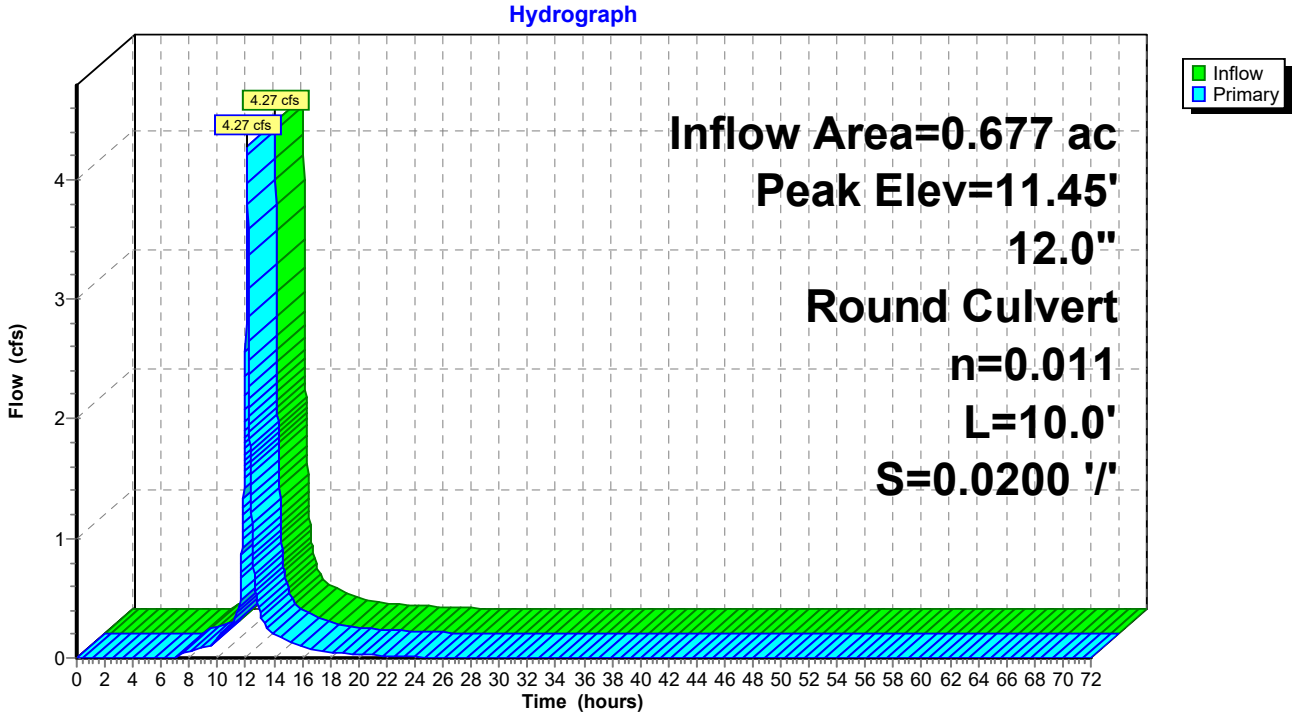
Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 5.05" for 100-YR event
Inflow = 4.27 cfs @ 12.10 hrs, Volume= 0.285 af
Outflow = 4.27 cfs @ 12.10 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min
Primary = 4.27 cfs @ 12.10 hrs, Volume= 0.285 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 11.45' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	8.90'	**12.0" Round Culvert** L= 10.0' Ke= 0.900 Inlet / Outlet Invert= 8.90' / 8.70' S= 0.0200 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.27 cfs @ 12.10 hrs HW=11.44' (Free Discharge)
1=Culvert (Inlet Controls 4.27 cfs @ 5.43 fps)

Pond 9P: OCS



Summary for Pond 10P: Existing DMH

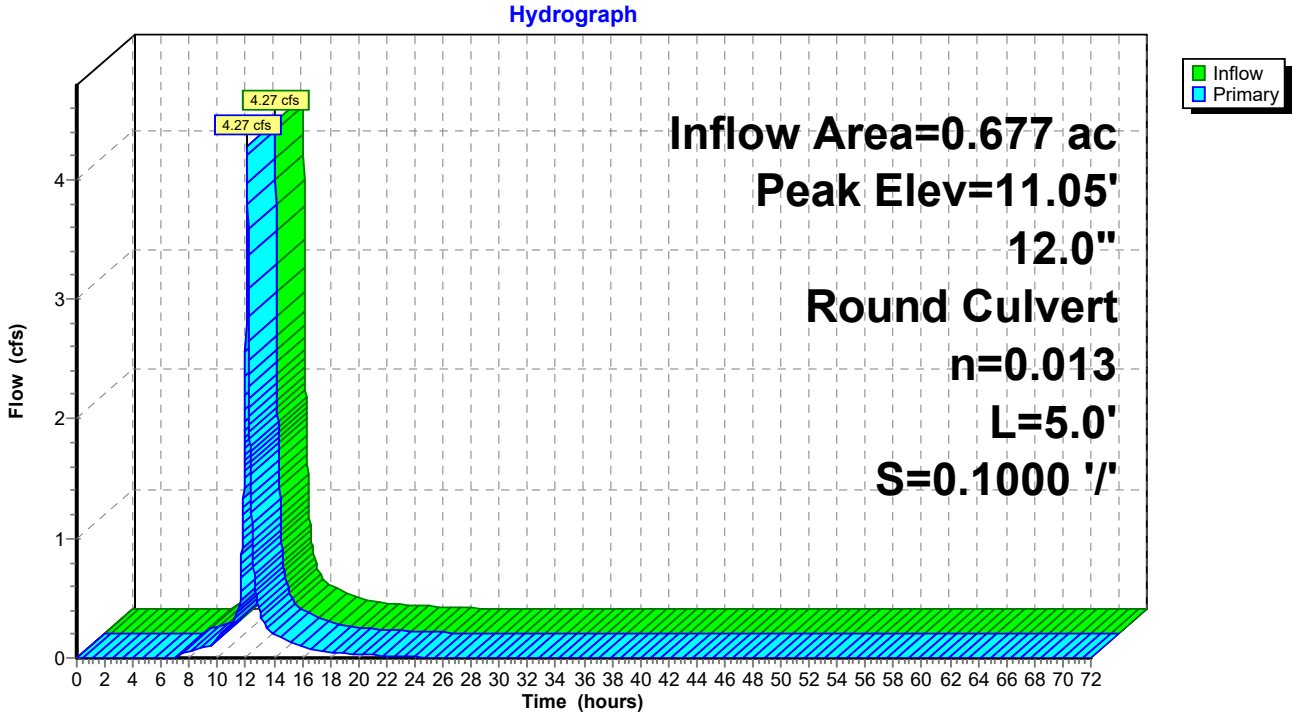
Inflow Area = 0.677 ac,100.00% Impervious, Inflow Depth = 5.05" for 100-YR event
Inflow = 4.27 cfs @ 12.10 hrs, Volume= 0.285 af
Outflow = 4.27 cfs @ 12.10 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min
Primary = 4.27 cfs @ 12.10 hrs, Volume= 0.285 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 11.05' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	8.50'	**12.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 8.50' / 8.00' S= 0.1000 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=4.27 cfs @ 12.10 hrs HW=11.04' (Free Discharge)
↳**1=Culvert** (Inlet Controls 4.27 cfs @ 5.43 fps)

Pond 10P: Existing DMH



Appendix D:
Water Quality, Recharge Volume and Drawdown Calculations

	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 Phone: (617) 482-7080 www.hshassoc.com	**Client:**	Mark Barer	**Sheet No.**	2 of 2
		Project:	11 Dartmouth Street Malden, MA	**Project No.**	19251
				Calc. By:	GNM
				Check'd By:	
		Description:	Stormwater Management Calculations	**Date:**	3/3/20

ENTER VALUES FOR HILIGHTED FIELDS

LOT AREA = 29,485 SF

PRE-CONSTRUCTION IMPERVIOUS AREA = 29,485 SF

POST-CONSTRUCTION IMPERVIOUS AREA = 29,485 SF

REQUIRED STORAGE VOLUME = 0.60 x Impervious Area
= 0.050 x 29,485
= **1,474** CF

PROPOSED STORAGE VOLUME = **1,530** CF

INFILTRATION SYSTEM

Inside width of one module = 7 FT
Inside length of one module = 15 FT
9.5 FT (Top weir elevation) - 6.5 (Bottom of concrete module) = 3 FT
Precast Concrete Module Volume = 4 x (15 FT x 7 FT x 3 FT) = **1,260** CF

Stone Mat Volume = 30% x (60 FT x 10 FT x 1.5 FT) = **270** CF

Total Storage Volume = Modules + Stone Volume = 1,138 CF + 45 CF = 1,183 CF

STORAGE VOLUME COMPARISON:

Location	Storage Volume Provided (CF)	Total Storage Required (CF)
Precast Module Volume	1,260	
Stone Mat Storage Volume	270	
Total Infiltration System Volume	**1,530**	**1,474**

1,530 CF PROPOSED > **1,474 CF** REQUIRED
1,183 CF PROPOSED > 1,114 CF REQUIRED

Hydrograph for Pond 1P: Infiltration 1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	5.50	0.00	0.00	0.00
2.00	0.02	4	5.55	0.01	0.01	0.00
4.00	0.03	25	5.83	0.03	0.03	0.00
6.00	0.04	53	6.19	0.04	0.04	0.00
8.00	0.07	106	6.88	0.06	0.06	0.00
10.00	0.14	299	7.87	0.10	0.10	0.00
12.00	**1.84**	**689**	**9.72**	**1.74**	**0.17**	**1.57**
14.00	**0.15**	**529**	**8.97**	**0.16**	**0.14**	**0.02**
16.00	0.08	401	8.36	0.12	0.12	0.00
18.00	0.05	173	7.27	0.08	0.08	0.00
20.00	0.04	64	6.33	0.04	0.04	0.00
22.00	0.03	44	6.07	0.03	0.03	0.00
24.00	0.03	29	5.88	0.03	0.03	0.00
26.00	0.00	0	5.50	0.00	0.00	0.00
28.00	0.00	0	5.50	0.00	0.00	0.00
30.00	0.00	0	5.50	0.00	0.00	0.00
32.00	0.00	0	5.50	0.00	0.00	0.00
34.00	0.00	0	5.50	0.00	0.00	0.00
36.00	0.00	0	5.50	0.00	0.00	0.00
38.00	0.00	0	5.50	0.00	0.00	0.00
40.00	0.00	0	5.50	0.00	0.00	0.00
42.00	0.00	0	5.50	0.00	0.00	0.00
44.00	0.00	0	5.50	0.00	0.00	0.00
46.00	0.00	0	5.50	0.00	0.00	0.00
48.00	0.00	0	5.50	0.00	0.00	0.00
50.00	0.00	0	5.50	0.00	0.00	0.00
52.00	0.00	0	5.50	0.00	0.00	0.00
54.00	0.00	0	5.50	0.00	0.00	0.00
56.00	0.00	0	5.50	0.00	0.00	0.00
58.00	0.00	0	5.50	0.00	0.00	0.00
60.00	0.00	0	5.50	0.00	0.00	0.00
62.00	0.00	0	5.50	0.00	0.00	0.00
64.00	0.00	0	5.50	0.00	0.00	0.00
66.00	0.00	0	5.50	0.00	0.00	0.00
68.00	0.00	0	5.50	0.00	0.00	0.00
70.00	0.00	0	5.50	0.00	0.00	0.00
72.00	0.00	0	5.50	0.00	0.00	0.00

INFILTRATION SYSTEM COMPLETELEY DEWATERED

Hydrograph for Pond 5P: Infiltration 2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	5.50	0.00	0.00	0.00
2.00	0.01	2	5.52	0.01	0.01	0.00
4.00	0.02	4	5.55	0.01	0.01	0.00
6.00	0.02	12	5.65	0.02	0.02	0.00
8.00	0.04	38	5.99	0.03	0.03	0.00
10.00	0.07	99	6.79	0.06	0.06	0.00
12.00	**0.92**	**435**	**8.52**	**0.53**	**0.12**	**0.41**
14.00	**0.08**	**219**	**7.49**	**0.09**	**0.09**	**0.00**
16.00	0.04	94	6.73	0.06	0.06	0.00
18.00	0.02	33	5.93	0.03	0.03	0.00
20.00	0.02	15	5.70	0.02	0.02	0.00
22.00	0.02	7	5.59	0.02	0.02	0.00
24.00	0.01	3	5.54	0.01	0.01	0.00
26.00	0.00	0	5.50	0.00	0.00	0.00
28.00	0.00	0	5.50	0.00	0.00	0.00
30.00	0.00	0	5.50	0.00	0.00	0.00
32.00	0.00	0	5.50	0.00	0.00	0.00
34.00	0.00	0	5.50	0.00	0.00	0.00
36.00	0.00	0	5.50	0.00	0.00	0.00
38.00	0.00	0	5.50	0.00	0.00	0.00
40.00	0.00	0	5.50	0.00	0.00	0.00
42.00	0.00	0	5.50	0.00	0.00	0.00
44.00	0.00	0	5.50	0.00	0.00	0.00
46.00	0.00	0	5.50	0.00	0.00	0.00
48.00	0.00	0	5.50	0.00	0.00	0.00
50.00	0.00	0	5.50	0.00	0.00	0.00
52.00	0.00	0	5.50	0.00	0.00	0.00
54.00	0.00	0	5.50	0.00	0.00	0.00
56.00	0.00	0	5.50	0.00	0.00	0.00
58.00	0.00	0	5.50	0.00	0.00	0.00
60.00	0.00	0	5.50	0.00	0.00	0.00
62.00	0.00	0	5.50	0.00	0.00	0.00
64.00	0.00	0	5.50	0.00	0.00	0.00
66.00	0.00	0	5.50	0.00	0.00	0.00
68.00	0.00	0	5.50	0.00	0.00	0.00
70.00	0.00	0	5.50	0.00	0.00	0.00
72.00	0.00	0	5.50	0.00	0.00	0.00

INFILTRATION SYSTEM COMPLETELEY DEWATERED

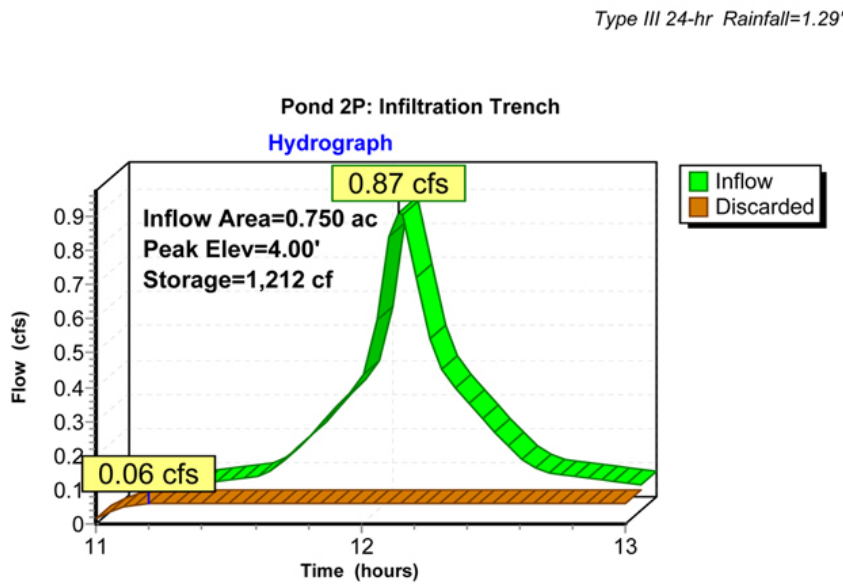


Table 2.3.3. 1982 Rawls Rates[18]

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate Inches/Hour
Sand	A	8.27
Loamy Sand	A	2.41
Sandy Loam	B	1.02
Loam	B	0.52
Silt Loam	C	0.27
Sandy Clay Loam	C	0.17
Clay Loam	D	0.09
Silty Clay Loam	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

[18] Rawls, Brakensiek and Saxton, 1982

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: 11 Dartmouth Street, Malden, MA

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Oil Grit Separator	**0.25**	**0.75**	**0.19**	**0.56**
Subsurface Infiltration Structure	**0.80**	**0.56**	**0.45**	**0.11**
	0.00	**0.11**	**0.00**	**0.11**
	0.00	**0.11**	**0.00**	**0.11**

Total TSS Removal = **89%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: HSH Associates
Prepared By: George N. Mihov, PE
Date: 10/9/2020

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Appendix E:
Operation and Maintenance Plan

11 Dartmouth Street, Malden, MA
Stormwater Management System

Operation and Maintenance Plan (O&M)
and
Long Term Pollution Prevention Plan (LTPPP)

This Stormwater Management System Operation and Maintenance Plan provides for the inspection and maintenance of structural Best Management Practices (BMPs) and for measures to prevent pollution associated with the **11 Dartmouth Street** Project located in Malden, Massachusetts

This document has been prepared in accordance with the requirements of the Stormwater Regulations included in the Massachusetts Wetlands Protection Act Regulations (310 CMR 10).

Stormwater Management System Owner:

Quaker Lane Capital
200 Portland Street,
Boston, MA 02114

A complete and thorough inspection of the stormwater management system shall be performed once a month during the first six months of operation and then as prescribed below. The Inspection and Maintenance Forms provided shall be prepared by qualified personnel.

The stormwater management system will be maintained properly to assure its continued performance, as follows.

1. Catch basins and area drains
    a. Inspect quarterly (January, April, July, October). Clean if sediment accumulation has reached ½ sump depth
    b. Sumps should be cleaned of sediment once per year.

2. Subsurface Infiltration Systems
    a. Inspect once a year (between March 1st – May 15th). Inspection should be scheduled after a storm event greater than or equal to 1 inch in a 24-hour period. The inspection must be completed within eight hours following the cessation of the storm, as reasonably practicable.
    b. Pretreatment devices should be cleaned and inspected annually. Infiltration systems receiving roadway runoff have an isolator chamber as a pretreatment device. Infiltration systems receiving non-pavement areas (e.g. rooftop runoff) have a deep sump manhole as a pretreatment device.
    c. Remove any debris that may clog system.

d. Remove sediment if depth reaches 3 inches.

3. Water Quality Units
   Follow manufacturer's recommendations including at a minimum:
   a. Inspect twice a year (spring and fall) minimum. One of the inspections should occur after a storm event greater than or equal to one inch in a 24-hour period, occurring within 8 hours following the cessation of the storm as reasonable practicable.
   b. Pump once per year to remove oils and sediment.
   c. Confirm system components are in working order and there are no obstructions in the inlet and separation screen.
   d. Measure depth to sediment/pollutant accumulation with a sediment probe, tape measure or other measuring device. System should be cleaned when the level of sediment has reached 75% of the capacity of the isolated sump or once a year, whichever is sooner
   e. Remove floatable trash, debris and oil
   f. Cleaning should be done during dry weather. A vacuum truck is the recommended method of removing pollutants from the system. Insert vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of

4. Outlet Control Structures
   a. Inspect quarterly (January, April, July, October)

5. Streets and Parking Lots
   a. Streets and parking lots shall be cleaned with vacuum sweepers, leaf blowers, or other means twice per year (generally May and November).
   b. Weekly cleaning shall be performed by landscaping crews using leaf blowers during the growing season.
   c. Curbing shall be inspected and repaired each spring, as necessary.

7. Building gutters
   a. Cleaned twice annually (typically during the spring and after the fall foliage season). Alternatively, gutter screens may be installed.

Practices for Long Term Pollution Prevention

Litter Pick-up

The Owner will conduct litter pick-up from the stormwater management facilities in conjunction with routine maintenance activities.

Routine Inspection and Maintenance of Stormwater BMPs

The Owner will conduct inspection and maintenance of the stormwater management practices in accordance with the guidelines discussed above.

Maintenance of Landscaped Areas

The Owner shall minimize use of herbicides and pesticides for the maintenance of facilities covered by this plan. Fertilizer use will follow the 330 CMR 31.05 regulations for "Requirements for the Application of Nutrients to Land Not Used for Agricultural Purposes."
If not removed from the site, landscaping waste products such as leaves and grass clippings should be composted in a designated area, no closer than 25-feet from a wetland resource . Such material should not be pushed into wetland areas.

Snow and Ice Management

Snow shall not be plowed towards drain inlets.

The following methods of de-icing or anti-icing shall be acceptable in any combination:

1) Use of a sand/salt mix (with or without additives) consisting of not more than 20% salt by weight
2) Use of calcium magnesium acetate (CMA) or potassium acetate (KAc), or blends thereof
3) Use of rock salt (with or without additives), granular or brine, if placed/spread by a calibrated spreader in accordance with quantity guidelines given in Minnesota Pollution Control Agency "Winter Parking Lot and Sidewalk Maintenance Manual", June 2015. The estimated quantity of salt used shall be logged on a per-storm basis and included in the annual report prepared by a Professional Engineer as outlined in the Record Keeping requirements of this O&M Plan. In addition to the estimated quantity of salt used, spreader calibration records will be made available to the Cambridge Water Department Watershed Division annually. Alternatively, the "chicken feed" method described on page 18 of the Manual may be used.

Salt will not be spread for winter storm management except in accordance with the above.

Prohibition of Illicit Discharges

The DEP Stormwater Management Standards prohibit illicit discharges to the storm water management system. Illicit discharges are discharges that do not entirely consist of stormwater, except for certain specified non-stormwater discharges.

Discharges from the following activities are not considered illicit discharges:

firefighting
water line flushing
landscape irrigation
uncontaminated groundwater
potable water sources
water used to clean residential buildings without detergents
foundation drains
footing drains
individual resident car washing
flows from riparian habitats and wetlands
dechlorinated water from swimming pools
water used for street washing
air conditioning condensation

There are no known or proposed illicit connections associated with this project.

Record Keeping

An "Inspection and Maintenance Form" shall be filled out each time a stormwater management system inspectional or maintenance work is performed. A binder shall be kept by the Owner or designated representative that contains all the completed inspection forms and/or photographs and related material.

On an annual basis, the Owner shall engage a Professional Engineer (P.E.) Registered in the Commonwealth of Massachusetts with expertise in stormwater management to review the operation and maintenance records from the previous year and perform an independent inspection of the stormwater management system to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan. The P.E. should prepare an annual summary report that includes his/her observations and maintenance recommendations for the stormwater management system. The annual report should include the logs of estimated salt use prepared as part of the Snow and Ice Management requirements of this O&M Plan. Additionally, all operation and maintenance records shall be retained for at least three (3) years and be provided to the City of Malden Conservation Commission and Building Department upon request.

Inspection and Maintenance Forms

INSPECTION AND MAINTENANCE FORM

STORMWATER BEST MANAGEMENT PRACTICES (BMPs)

Drainage System: ***Catch Basins*** Date: _____ Time: _____

Weather/Temp.: _____ Inspector(s): _____

Date of Last Precipitation: _____ Precipitation Amount: _____ *Inches*

Precipitation Type: _____ Location Onsite: _____

Scoring Breakdown:	
N/A = Not Applicable	1 = Monitor (potential for future problems exist)
N/I = Not Investigated	2 = Routine Maintenance Required
0 = Not a problem	3 = Immediate Repair Necessary

1. Stormwater Structures							
Sediment accumulation >½ sump depth	No	Yes	0	1	2	3	Amount: _____ in.
Evidence of oil/grease accumulation	No	Yes	0	1	2	3	
Other							
2. Pipes							
Broken	N/A	N/I	0	1	2	3	
Clogged	N/A	N/I	0	1	2	3	
Submerged Outlet Pipe	N/A	N/I	0	1	2	3	

Overall Condition

Inspector's Summary:

INSPECTION AND MAINTENANCE FORM

STORMWATER BEST MANAGEMENT PRACTICES (BMPs)

Drainage System: ***Water Quality Unit*** Date: _____ Time: _____

Weather/Temp.: _____ Inspector(s): _____

Date of Last Precipitation: _____ Precipitation Amount: _____ *Inches*

Precipitation Type: _____ Location Onsite: _____

Scoring Breakdown:	
N/A = Not Applicable	1 = Monitor (potential for future problems exist)
N/I = Not Investigated	2 = Routine Maintenance Required
0 = Not a problem	3 = Immediate Repair Necessary

1. Stormwater Structures							
Sediment accumulation >75% capacity of isolated sump	No	Yes	0	1	2	3	Amount: _____ in. **
Evidence of oil/grease accumulation	No	Yes	0	1	2	3	
Other							
2. Pipes							
Broken	N/A	N/I	0	1	2	3	
Clogged	N/A	N/I	0	1	2	3	
Submerged Outlet Pipe	N/A	N/I	0	1	2	3	

Overall Condition

Inspector's Summary:

*See manufacturer's operation and maintenance manual for additional details.

INSPECTION AND MAINTENANCE FORM

STORMWATER BEST MANAGEMENT PRACTICES (BMPs)

Drainage System: ***Infiltration System*** Date: _____ Time: _____

Weather/Temp.: _____ Inspector(s): _____

Date of Last Precipitation: _____ Precipitation Amount: _____ *Inches*

Precipitation Type: _____ Location Onsite: _____

Scoring Breakdown:	
N/A = Not Applicable	1 = Monitor (potential for future problems exist)
N/I = Not Investigated	2 = Routine Maintenance Required
0 = Not a problem	3 = Immediate Repair Necessary

1. Isolation Chambers							
Sediment accumulation > 3”	No	Yes	0	1	2	3	Amount: _____ in. *
2. Sump Manholes							
Sediment accumulation > ½ sump	No	Yes	0	1	2	3	Amount: _____ in. *
3. Infiltration Chambers							
Sediment accumulation > 3”	No	Yes	0	1	2	3	Amount: _____ in. *
4. Pipes							
Broken	N/A	N/I	0	1	2	3	
Clogged	N/A	N/I	0	1	2	3	
Submerged Outlet Pipe	N/A	N/I	0	1	2	3	
5. Water Level							Amount: _____ in. *
6. Time Required For System To Fully Drain							Time: _____hr. _____mins.

Overall Condition

Inspector’s Summary:

INSPECTION AND MAINTENANCE FORM

STORMWATER BEST MANAGEMENT PRACTICES (BMPs)

Drainage System: ***Outlet Control Structure*** Date: _____Time:_____

Weather/Temp.: _____ Inspector(s): _____

Date of Last Precipitation: _____ Precipitation Amount: _____ *Inches*

Precipitation Type: _____ Location Onsite: _____

Scoring Breakdown:	
N/A = Not Applicable	1 = Monitor (potential for future problems exist)
N/I = Not Investigated	2 = Routine Maintenance Required
0 = Not a problem	3 = Immediate Repair Necessary

1. Stormwater Structures							
Sediment accumulation >½ sump depth	No	Yes	0	1	2	3	Amount: _____in. **
Evidence of oil/grease accumulation	No	Yes	0	1	2	3	
Other							
2. Pipes							
Broken	N/A	N/I	0	1	2	3	
Clogged	N/A	N/I	0	1	2	3	
Submerged Outlet Pipe	N/A	N/I	0	1	2	3	

Overall Condition

Inspector's Summary:

*If sediment depths are greater ½ the depth of sump, sediments should be removed as soon as possible.

Appendix F:
Illicit Discharge Compliance Statement

Illicit Discharge Compliance Statement

To the best of my knowledge, belief, and information, the stormwater management system servicing the 11 Dartmouth Street in Malden, MA will not receive illicit discharges, including wastewater discharges or stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, or hazardous substances.

There are no known or proposed illicit connections associated with this project. If a potential illicit discharge to the facilities covered by this plan is detected (e.g. dry weather flows at any pipe outlet, evidence of contamination of surface water discharge by non-stormwater sources), Quaker Lane Capital foreman shall be notified for assistance in determining the nature and source of the discharge, and for resolution.

The stormwater management and conveyance systems are shown on the plans entitled "11 Dartmouth Street Drainage and Utility Plan" prepared by Howard Stein Hudson and included with the Notice of Intent submittal.

Signature: Mark Barer

Mark Barer
Quaker Lane Capital
200 Portland Street,
Boston, MA, 02114

Appendix G:
Proposed Plans (under Separate Cover)

Section 5.
Special Permit Plans

PROVIDED UNDER SEPARATE COVER